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9 SEPTEMBER 1986

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CONTENTS

ASIA

PHILIPPINES

Communications Industry Row Brews in Constitution Hearing
(Rene M. Alviar; Manila MANILA BULLETIN, 9 Aug 86)........ 1

EAST EUROPE

INTERNATIONAL AFFAIRS

Officials Comment on Plans for Bloc Satellite TV Net
(Franciszek Skwierawski; Warsaw PRASA POLSKA, No 7, Jul 86).. 2

HUNGARY

Development of Electronics: Prerequisite for Development
(Karoly Borsos; Budapest HIRADASTECHNIKA, No 2, Feb 86)... 8

Remote Control System for Radio Relay Chains
(Ferenc Vadaszi; Budapest, HIRADASTECHNIKA, No 2, Feb 86).. 22

Transfer of High-Level Compiler Programs Between Z-80 Based Microprocessor
(Gabor Hosszu; Budapest HIRADASTECHNIKA, No 2, Feb 86)..... 30

Microwave Components Operating Over 10 GHZ
(Bela Zsoldos, et al.; Budapest HIRADASTECHNIKA, No 2, Feb 86).. 37

LATIN AMERICA

BRAZIL

Controversy, Ignorance Surrounding Informatics Law Viewed
(Sao Paulo VEJA, 16 Jul 86)................................ 43

VENEZUELA

Digital Phone Installations From Ericsson, Siemens, Nippon
(SVENSKA DAGBLADET, 1 Aug 86)............................. 55

SUB-SAHARAN AFRICA

SOUTH AFRICA

SABC Announces FM Frequency Changes
(Johannesburg Domestic Service, 1 Aug 86).................. 56

SWAZILAND

Briefs
Satellite Station Expansion Plans 57

WEST EUROPE

FRANCE

Initial Structure, Business Lines of CGE-ITT Joint Venture
(Paris LE MONDE, 4 Jul, 1 Aug 86)........................... 58

Implications of Merger, by Eric Le Boucher 58
New Organization 62

SWEDEN

Ericsson Hopes for Ten-Percent Share of U.S. Market
(Dan Magnerot; Stockholm DAGENS NYHETER, 19 Jul 86)......... 63

Ericsson Increasingly Alone as Competitors Tighten Links
(Stockholm, SVENSKA DAGBLADET, various dates).............. 66

Shuns Merger, Foreign Tie, by Jerry Simonsson 66
U.S. Tests Expensive, by Lennart Lundquist 67
Losses From U.S. Venture, by Uno Skold 68
Company Wants Own Finance Company, by Bjorn Suneson 69

/6539

COMMUNICATIONS INDUSTRY ROW BREWS IN CONSTITUTION HEARING

HK111142 Manila MANILA BULLETIN in English 9 Aug 86 p 15

[Article by Rene M. Alviar]

[Text] A heated debate on control over the telecommunications industry brews at the Constitutional Commission [Concom] as two interest groups continue to lobby for their positions in preparation for next week's plenary on "National Economy and Patriomony."

The Philippine Chamber of Communications (PCCI), through spokesman Santiago Morales, has drawn up a position to counter a letter sent to Concom President Cecilia Munoz-Palma during the weekend by the American Chamber of Commerce of the Philippines (ACCP). The latter endorsed the retention of the 60-40 equity participation in the telecommunications industry.

In his letter to Palma, Morales on the other hand, fought not only for a bigger Filipino equity but also for an end to management contracts with foreign multinational carriers who control the three major international record carriers (IRCS) in the Philippines.

PCCI is fighting for a 66.5 percent Filipino control and 33.5 percent foreign equity in the local telecommunications industry. It also wants the including of a provision in section 15 of the committee's report prohibiting foreigners from sitting in the board of directors.

PCCI appealed to the Concom for the amendment of Sec. 15 of Revolution No 496 proposed by the committee to include the phrase: "Only citizens of the Philippines shall be allowed to sit in the governing body of any public utility and no foreigner or corporation, association or any other entity which is not wholly-owned by Filipinos shall be allowed to manage, control, administer or operate public utilities."

Morales in the same letter cited the adverse effects of foreign domination of vital public utilities.

He pointed out that up to this time, the three major international record carriers were dominated by transnationals through management contracts even if their Filipino partners have already acquired 40 percent of the equity of these vital enterprises.

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CSO: 4200/1316

OFFICIALS COMMENT ON PLANS FOR BLOC SATELLITE TV NET

Warsaw PRASA POLSKA in Polish No 7, Jul 86 pp 18-20

[Article by Franciszek Skwierawski: "When Is There Going to Be Polish Satellite TV?"]

[Text] The first plans for the development of television in Poland, drafted in 1975 for 1976-1990, projected that before the end of the 1970's Channel 1 programs would be accessible to 98 percent of the population and Channel 2 to 80 percent. The plans also promised that before the year 1990 the network of Channel 3 would be completed. Today we know that these promises were not fulfilled and that it is only by 1995 that the two channels will be available all over the country, while the construction of a third broadcast network with a system of ground stations has become questionable in this era of satellite television. Today, just one communication satellite orbiting around the equator can create on the entire territory of the nation excellent transmission and reception of not just one but as many as five television programs. Furthermore, this celestial emission unit does not use a single watt of electricity--it is powered by solar batteries. Satellite television also leads to the saving of valuable steel that would otherwise be used to build ground television networks. Actually, the annual allotments of steel enabling the Ministry of Communications to construct just one television tower is the limiting factor of the development of the two broadcast networks of Polish Television.

Polish Satellite

When can we hope to see satellite television in Poland? We addressed this question to:

● Professor Dr. Wladyslaw Majewski, the minister of communications of the Polish People's Republic:

"The Ministry of Communications for many years has been working together with other CEMA nations to realize the Interkosmos program. Poland has developed a prototype of "satellite television." It was created at our Institute of Communications at Miedzeszyn. Currently, negotiations are under way with the industry concerning the introduction of large-scale manufacturing of these sets. But in order to receive a program it first has to be trans-

mitted. This is the responsibility of the Soviet side, which undertook to build and equip a satellite and launch it into geostationary orbit. This will probably occur by the late 1980's. It is envisaged that this will be a cooperative satellite for all socialist countries in Europe. After a brief trial period, general transmissions of television programs will begin. In Poland we will be able to receive these programs after 1990. During the initial period, the satellite television programs will be received by group antenna installations which, of course, does not rule out individual reception."

- Vasiliy Shamshin, the minister of communications of the USSR:

"Satellite television is an important financial problem. Our Polish colleagues must contemplate this. Given Poland's large territory and population density, various technological solutions should be considered which are efficient from an economical point of view. All this has to be calculated precisely. When a concept like this is created we can use our experience to resolve this problem working together with our Polish colleagues.

"I don't see any barriers that could not be surmounted. There is a variety of possible solutions. Talking about the financial aspect of this enterprise, the expenses of television viewers should also be taken into account. Television is not an inexpensive appliance that you can easily throw out and buy a new one. We should think of what would be cheaper and therefore more practical."

Satellite television has recently been discussed by Zygmunt Trzebiatowski, assistant secretary-general of the International Organization of Radio and Television (OIRT); speaking in Prague, he said:

"This is a complex problem if one speaks of the possibility of direct reception of satellite television by household sets. Transmission of a television image from space requires building satellites with a high emissive power and the use of a special antenna and reception unit connected to the television. The cost of building a high-power satellite is substantial, and the reception equipment will cost three or four times as much as an existing color television set. This is not something affordable to an average worker. Transmitting from satellite to a ground station and then bringing the program by cable to viewers' residences is also costly. Relatively less expensive is the reception of satellite programs and retransmission to viewers through a network of reception-transmission stations, as is practiced on large territories in the USSR. In addition, there is a question concerning the contents and form of such an international program produced by members of our organization. (...) For this reason, there is a need for a joint discussion concerning the purposefulness of this program, the technical and financial feasibility and the existence of a public need for a direct transmission of satellite television programs, not to mention the mix of such an 'interprogram' that would be created under the auspices of OIRT. We plan to exchange views on this complex subject at the session of the executive board of the organization in Helsinki in May and also during the fall session of the Intervision Council."

It is unknown whether these remarks by Zygmunt Trzebiatowski are inspired by pessimism or realism. There can be no doubt, however, that it will be a long time before we have a satellite television program in Poland. However, one cannot agree with the suggestion of "discussing purposefulness of such a program and its public need" or "initial exchange of views." Calling for such a discussion today, when nobody except for us has any doubt about this issue, is too late. Today, one can only sit down with our neighbors and establish a cooperative plan for implementation of satellite television. Discussing whether it is worthwhile means simply wasting time. One may also recall the slogan by which the French were guided: "If you don't have your own satellite television, you will find yourself in the range of someone else's network, not always friendly to you." The decision about the purposefulness of having such a program has already been made; it has been made for us by others.

Zygmunt Trzebiatowski's statement concerning the price of satellite television must also be corrected. The statement that it is going to cost three to four times as much and that it is unaffordable for a working person is somewhat exaggerated. In Japan, where direct reception of satellite television is already in place, the equipment units that can pick it up cost $400 to $500. It should be added that for receiving satellite programs one can successfully use the conventional television combined with a decoder and parabolic antenna. Nobody, after all, is suggesting that the millions of existing black-and-white and color units all be dumped on a certain day because of the advent of satellite television. Zygmunt Trzebiatowski suggests that it would be less expensive to receive signals from satellites by receiver-transmitter stations, as on large territories in the USSR. This must be a misunderstanding. Those systems are used to transmit images over long distances and can only be used there. Neither Poland nor any other European country has such large territories and distances. The entire Europe and world are planning to switch to direct-reception satellite television with the program beamed from satellite to the television set.

Joint Satellite System

One solution which will become a reality around 1990 is a joint satellite television system embracing several programs and realized by joint efforts of European nations which are members of Intervision. Economic considerations in the operation of a communication satellite suggest simultaneous emission of a minimum of four television programs. A basic difficulty in the implementation of these plans is the language barrier. No such problem existed for the developers of the first such venture--satellite program SAT-3, addressed to German-language viewers in a joint project by the television companies of West Germany, Austria and Switzerland. It seems that in our conditions several solutions should be adopted. One can divide the emission time between countries, assigning them the respective national "windows," or, finally, one can emit all or selected programs in several language versions, although this would require using television sets equipped with an appropriate attachment. There is no time left for discussion; concrete actions should be taken. The world has made its choice and decided in favor of satellite television.

However, during the initial pioneering and experimental period, the socialist nations will have to be content with the realization of joint television programs. Subsequent developments will certainly bring into life the use of two satellite stations which will serve all European socialist countries and the Soviet Union. It will then be possible to make available for exclusive use of each of these countries one satellite channel for television and several channels for radio broadcasts. Such a situation would be satisfactory during the initial period to everybody, because each of these countries has two channels, but needs a third. Under such an arrangement, the functions of the existing Channel 1 program--carrying news and information--would be taken over by the satellite, while the network of Channel 1 program would be used for the emission of the current Channel 2 program. The latter's broadcast network would then be used to transmit educational-cultural or regional programs.

The Place for a Polish Satellite

At the famous world Administrative Radio Communication Conference, which met in Geneva in 1977, Polish satellite was given the place on geostationary orbit at 1 degree of western longitude, namely, at the level of the Guinea Basin. Yet, Warsaw is situated at 21 degree of eastern longitude corresponding to the Congo depression. One may ask: Why is our satellite located so far away? Is it a sign of discrimination? It turns out that that is not the case. The division was fair. Almost all wishes expressed by the individual countries were taken into account. Why is it then so far away? This was determined exclusively by technical and astronomical considerations. With this localization we receive most favorable conditions for transmission, which guarantee every day, up to 12:20 a.m. Central European Time, uninterrupted transmission and reception of television and radio broadcasts. In spring and fall, there are so-called eclipse effects, which last for several weeks, when the satellite is shadowed by the earth, making it impossible for solar batteries which power the onboard reception-transmission equipment to operate. The location offered to Poland protects our satellite from these negative effects.

On this celestial orbit our neighbors will be the satellites of GDR, Czechoslovakia, Hungary, Rumania and Bulgaria, which offers excellent conditions for cooperation, for example, joint exploitation of one satellite similar to such joint plans of Scandinavian countries, which have developed Nordsat satellite television system.

The location assigned to Poland is over the African continent, which has spared us some trouble. This was not the case with countries whose satellite locations were assigned over Africa or South America. Certain countries, such as Ecuador, Gabon, Kenya, Colombia, Congo, Uganda and Zaire, raised the question of sovereignty of their space, demanding a fee for placing the satellite in orbit. The claims of these equatorial countries were ignored. It is assumed customarily that the outer space begins at an altitude of 100-105 km and is not national property. In case of satellite television, therefore, one cannot speak of violation of the air space of any nation.

Various questions in the broad range of issues associated with the future operation of direct-reception satellite television have been for many years the subject of research and development by member nations of the Council for Economic Mutual Assistance. The Soviet Union has been working on technology of satellite transmission, while Poland was responsible for the technology of production of the television and the antenna for reception of satellite programs. This difficult task was undertaken by scientists at the Institute of Communications at Miedzeszyn. Realizing that we will enter the era of satellite television with our veteran black-and-white and color sets, a receiving unit of satellite radio emissions has been constructed in the frequency of 12 GHz to be attached to the standard television set. The equipment will consist of a parabolic antenna and a microwave unit installed on one's roof and the converter of satellite radio emission signals into signals that can be handled by the existing televisions. The development of this equipment is conducted while communication satellites are not available. In this situation, at the altitude of 140 m, a satellite transmission simulator has been installed at the 33rd floor of the Palace of Culture and Science in Warsaw. The reception antenna is located at a distance of 17 km in Miedzeszyn on the roof of the Institute of Communications. The simulated signals of the future satellites are received here.

When will a Polish television satellite appear in space? No one can answer this question in Poland. Will we accomplish it before the end of the century? Probably not. If for 34 years in the area of ground-based television we did not manage to cover the entire country by the network of Channel 1 program and made Channel 2 programs accessible to just three-quarters of the country, can we assume that now in the difficult economic situation we will be able to venture into space on our own?

Actually, national satellite stations will be first installed by the richest countries of the world. In Europe the first to do so will be West Germany, France, Britain and Luxembourg, while Scandinavian nations plan a joint collective station. It seems that a similar joint station in space will be installed by the CEMA countries. Initial plans suggest that this will happen after 1990.

Such a celestial television station is a powerful transmission unit, weighing a few tons, which can transmit simultaneously four or five television programs and 15 radio programs. Channels will also be used for telephone and telex communications. Obviously, launching a station into orbit and then operating these television channels, while today we hardly manage to fill two channels, will involve immense financial outlays. It is no wonder, therefore, that satellite television in this initial pioneering period will be the prerogative of affluent nations.

It has been said that satellite transmission technology ushers in a new, fourth period of change in the system of human communications (after speech, writing and print). It is said that in our television we have not joined the impressive revolution which will shortly encompass the mass media.

Our neighbors across the border have a different view of satellite television issues: "Transmitting television programs through satellite offers a better picture and sound quality, a fuller coverage of the country with the programs and savings of power and labor. Annual transmission cost of the two television channels of GDR would be reduced from 100 million to around 30-40 million marks."

Maybe we should also think about it.

[Caption to illustration] System of direct-reception television. Ground station on the left transmits the program to the satellite, which sends it back to earth. Reception is possible through a receiving antenna installed on a residential building, on the roof of a single-family home or by means of a large reception antenna which then distributes the program through cables to the residents of an entire community.

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CSO: 5500/3016

DEVELOPMENT OF ELECTRONICS: PREREQUISITE FOR DEVELOPMENT

Budapest HIRADASTECHNIKA in Hungarian No 2, Feb 86 pp 49-56

[Article by Karoly Borsos: "Use of Electronics on a Social Scale as a Prerequisite for Further Development". Manuscript received 30 Sep 85. The first paragraph is the Hungarian language summary.]

[Text] Summary

In our country the decrease in the number of creative workers takes place at a faster pace than the decline of the population. This circumstance, and the increasing shortage of energy and raw materials, presents a forced path which means adopting the possibilities offered by electronification in the interest of the further development of the people's economy. But adopting the new technologies is not simply a question of deciding to do so. In the next 15 years it will require a provision of the material and human prerequisites. Among the material prerequisites an outstanding role must be attributed to building up a national telecommunications system suitable for transmission of all sorts of information. And on the human side we must develop the methods of the information economy and raise the work culture. Solving the problem requires material and intellectual resources equally.

As a consequence of the decrease in the population of our country and the unfavorable development of it in composition according to age, the shortage of energy and raw materials and the increasing economic competition we have gotten onto a forced path on which there must be a deliberate acceptance of the possibilities offered by electronics and microelectronics, liquidating the backwardness which has existed in this area thus far. By exploiting the most purposeful frameworks for the spread of electronics and the efficient operation of the systems built therewith in the time still available until the turn of the century we must guarantee the human and material prerequisites because it is probable this will not be possible later as a consequence of the accumulation of shortages and an increase in backwardness. Raising the level of knowledge and creating the work culture are slow processes, requiring in general 20-30 years, but this duration can be reduced to 15 years with planned work and a parallel elimination of the deficiencies existing in the several areas. Providing the material prerequisites also should be started simultaneously on several levels. Among the latter we must mention first of

all the necessity of building up a telecommunications network providing a foundation for the entire informatics system.

In essence what stands before us is an innovation program of gigantic scale to be realized in 15 years. The task of this program is to increase the material and human components of national wealth to such a degree as to ensure the continuity of development despite the worsening circumstances, to replace the losses deriving from the exhaustion of productive land and mineral treasures, and in the final analysis this means increasing the national wealth.

The spread of microelectronics and the speed with which it is used differs by use area and by country. If we look at the technically developed countries we can establish their almost uncatchable advantage, but if we study the developing states of Southeast Asia (South Korea, Taiwan, Thailand) then we can conclude that we are still in competition with them and we can maintain or even increase our advantage vis-a-vis the countries of South America which are at the same economic level as we if the powerful electronification program is successfully planned and executed.

Within the framework of this program one can measure relatively precisely the status of telecommunications and the development of the demands being made of telecommunications. Considering that the existence of a quantitatively and qualitatively satisfactory telecommunications system is a prerequisite for the flow of information and thus for industrial, agricultural, administrative and social development we will deal below with this problem group in detail. Following this we will discuss the status of the forced path.

1. Social and Economic Frameworks, Environmental Effects

In our country, which lies geographically on the border of the socialist and capitalist world and borders unaligned Yugoslavia to the south, telecommunications and in general the environmental effects determining the development of electronics have a strong influence, in addition to the general political effects. The environmental effects are realized not only along the borders but on a world scale thanks to trade and the international division of labor and thanks to cultural and other contacts.

It can be established from statistical data pertaining to the supply of telephones that as of 1 January 1981 there were 425.1 million telephones in the world and 80.42 percent of the total amount were in the hands of 725 million people. An additional 925 million can be regarded as moderately developed from the viewpoint of telecommunications; they have 15.09 percent of the telephones. We can regard as backward in telecommunications 63.3 percent of the population, that is 2,841 million people; only 4.29 percent of the telephones are at their disposal.

Hungary and the European socialist countries belong in the category of moderately developed countries; with a telephone density of 10.51 per 100, below the world average of 11.69 per 100 residents, they have 42.3 million telephones. (Table 1.)

Table 1. Telephone Supply of the European Socialist Countries, 1 Jan 81

Country	Population (1,000's)	All Telephone Sets (1,000's)	Density Sets per 100	Density Percent Increase 1971-1981
Czechoslovakia	15,289	3,150	20.6	49.2
GDR	16,740	3,166	18.9	56.2
Bulgaria	8,881	1,256	14.1	156.3
Hungary	10,713	1,261	11.8	46.2
Romania	22,000	2,600	11.8	--
Soviet Union	271,200	26,667	9.8	95.5
Yugoslavia	22,262	2,133	9.6	163.9
Poland	35,735	3,387	9.5	64.9
Total	402,820	42,349	10.51	

The values of per capita gross national product are similar to the distribution of telephones, although it is possible to conclude from a comparison of the two data lines that telephone density here is substantially lower than the per capita GNP in US dollars would justify.

Studying the problem of telephone supply we can establish that our backwardness is dangerously great. At the end of 1980 the density in European number zones 3-4 was 35.6 per 100 residents as compared to our value of 11.7 per 100 residents. Our open economy must adjust to our capitalist and socialist partners who have a higher density. This statement is supported by telephone and telex traffic (Table 2) and by tourist travel, if we take hotel occupancy as a base.

At the present time a telephone density of at least 18 per 100 and a completely automated telephone system would suit our production conditions and social needs according to economic calculations which are presumably known. Great damage results from the shortages in the area of telephones. For example:

Lost postal income	3.5 billion forints per year
Losses in production	5.0 billion forints per year
Social damage	3.0 billion forints
Total	11.5 billion forints per year

Added to this are the losses, of perhaps several billion forints, deriving from the lack of a large part of the data network needed for efficient operation of a computer inventory worth more than 22 billion forints. These losses can be reduced only with an intensive development of the network. Automation of the national network and achieving a density of at least 15 per 100 inhabitants are prerequisites for ending the losses arising in production; in addition we must provide sufficient circuits for various data transmission systems. In order to end the lag in postal income and eliminate the social damage deriving from the lack of telecommunications it would be necessary to

completely satisfy the expected needs, which would mean a density of 40-42 per 100 inhabitants by the turn of the century. This value cannot be attained today but providing a density exceeding a value of at least 30 per 100 must be considered necessary. In this case the economicalness of the interurban network built up primarily for public institution purposes could be substantially increased the traffic of residential telephones in off hours. In addition, after the turn of the century, if the national network has been built up, satisfaction of the needs of the populace could take place with an annual 6 percent development, at a fast pace and at a relatively low cost level. By then an annual 6 percent would mean 180,000-200,000 new telephones per year.

Table 2. International Outgoing Telephone and Telex Traffic (1982)

	Initiated Telephone Traffic		Telex Correspondence Time	
	Minutes (1,000)	Percent	Minutes (1,000)	Percent
Within Europe:				
Total	23,496	100.0	5,955	100.0
Of this:				
FRG	6,724	28.6	1,285	21.7
Austria	3,904	15.6	806	13.5
Switzerland	1,648	7.0	264	4.4
Soviet Union	1,365	5.8	336	5.6
GDR	1,235	5.2	366	6.1
Czechoslovakia	1,154	4.9	384	6.4
Italy	1,144	4.9	306	5.1
Sweden	1,082	4.6	130	2.2
Other	5,240	23.3	2,078	34.9
Outside Europe:				
Total	454	100.0	756	100.0
Of this:				
USA	159	35.0	187	24.7
Canada	48	10.6	8	1.0
Israel	20	4.4	9	1.2
Egypt	7	1.5	29	3.8
India	1	0.2	41	5.4
Iraq	12	2.6	54	7.1
Iran	5	1.1	48	6.4
Japan	12	2.6	43	5.7
Other	190	41.9	337	44.6

The question is whether the goal of 30 per 100 can be realized. If we study the rate at which different socialist and capitalist countries developed their networks up from the value of 10 per 100 inhabitants we get a very interesting figure (Figure 1). It can be seen that quite different programs are being realized from the 3.6 percent annual growth which has developed here to the 12.5 percent annual rate maintained thus far in South Korea. In any case, to

attain a density of 30 per 100 there must be a radical change in our development policy.

Figure 2 shows what thousandth of their GNP some countries close to us economically turned to development of telecommunications. We can see from the data that we are in last place and it can be established that even the South American states struggling with severe debt burdens are working at a faster developmental pace than we.

If we leave our developmental rate unchanged then by the turn of the century we will be behind those South American states so often considered backward from the viewpoint of telephone supply. In addition, if we consider that the number of persons per household here is 2.8 while it is 3.5 in Uruguay and Argentina then the density of 10-11 per 100 there represents a better supply than ours.

In addition to the telephone service in public use the telecommunications network is also the foundation for other postal services (telex, telegraph, data transmission, etc.) and for exclusive services. The significance of the latter will increase substantially compared to earlier as a result of data transmission needs in the case of modern production, agriculture, stockpiling and transportation systems.

We get a picture less favorable than telephone supply if we study data for electronics consumption (industrial, service, public, etc.). In some of the developed countries this exceeds a value of 500 dollars per person per year. The world average is 100 dollars per person per year while use for us can be estimated at 50 dollars per person per year. The dynamic development in this area in the developed capitalist countries in the past decade has developed despite the economic recession, or put more precisely it has overcome the recession.

Here electronification has not yet been built adequately into production, public administration, services or social life. In many cases the spread of computers has been guided not by an internal necessity deriving from the process but rather has been motivated by some sort of status symbol character. Efficient applications methods for computers (money turnover, health affairs, inventory management, etc.) have not developed. It might be said of the situation that the backwardness is substantially greater in use areas representing intellectual work than at the level of computers.

A study of the developmental trends of technologically leading countries permits the conclusion that products requiring intellectual capital and research are becoming sources of equal value with natural resources, they result in significant raw material and energy savings and on this basis the information economy plays a significant role in the production of national income.

The information sectors combined create more than 25 percent of the national income in the entire economy of the United States. I do not know to what extent the growth of the profits of information management from 38 billion dollars in 1948 to 266 billion dollars in 1973 contributed to increasing total

national income from 226 billion to 956 billion dollars, but there can be no doubt that it had a significant role in increasing the performance of agriculture, industry, services and public administration.

Information has always had great significance in economic and social life, but its role has increased substantially since the 1960's with electronification, and research on this began then too with the work of F. Machlup and M. V. Porat.

A substantial change in the development of science has also taken place in recent decades. A sufficiently large intellectual and material expenditure is a prerequisite for the effectiveness of much basic and applied research. This circumstance puts small and medium sized countries into a disadvantageous situation if they cannot participate organically and in accordance with their interests in strong international cooperation.

In general the effects of the spread of microelectronics have a positive character. The negative side cannot be measured as yet, but according to some signs society can be injured easily so sociological research must be directed to this theme parallel with the technical development. The unsolved nature of the social problems, however, cannot hold back technical development because backwardness in this area represents the greater danger.

In the near future the production capacity of the industrially developed countries will substantially exceed the possibilities of the receiving markets, so competition will sharpen, and products which are not modern, which are not prepared with little energy consumption and material use, will be incapable of being sold.

2. The Situation Developing by the Turn of the Century

From the social viewpoint the situation of Hungary can be called serious for the long run. According to UN forecasts the population of the world will be 6,200 million people by the turn of the century. The overwhelming part of the increase will be in countries presently considered backward. While the population will increase by an average of 11.3 percent in Europe and North America there will be a 5 percent decrease for us. Beyond this, as a result of aging, the ratio of workers and dependents will deteriorate from the present roughly 50-50 percent to perhaps 40-60 percent, with a little exaggeration. The situation will be worsened further by the fact that the ratio of defectives, of those in a disadvantaged situation on familiar foundations, will increase in the younger age groups. These latter will be suitable only for unskilled work or work equivalent to it, so independent of changes in wages the real value of their performance can be regarded as constant, or as increasing only in proportion to a reduction in waste.

In the years following the turn of the century the labor force capable of greater performance than at present intellectually and physically and from the viewpoint of work morale under favorable conditions can be estimated at barely 3 million, plus an unskilled force of one million.

So in the next 15 years the number of workers will gradually decrease by one million. If the standard of living of workers and dependents is not to decrease compared to the present one it is absolutely necessary that the average performance of the 4 million workers available then exceed the present level by at least 25 percent.

This 25 percent increment is not significant in itself, but if we consider that stagnation means falling behind in the case of a developing environment then we must prescribe an additional 25 percent increase for the entire population in the remaining 15 years which, because of the deterioration in the ratio of workers, means a 31 percent performance increase per worker.

This average of 25+31=56 percent must be increased further for the creative workers because the productivity of the unskilled workers can be taken as unchanged. This increase represents an additional 19 percent, so after the turn of the century the performance of each trained worker must exceed the present level by at least 75 percent. The economic trends reigning today--holding back investments in the interest of maintaining solvency, shifting the burdens of weakly producing enterprises to those working well, prolonging the life of old structures with reconstruction, etc.--do not tend in the direction of solving the problems. We are striving for momentary advantages instead of solving the long term problems, although one cannot expect from the succeeding generations that they should deal with a liquidation of the inherited deficiencies, creating favorable prerequisites for work while producing more, under conditions which are worse than those today.

Development of the telecommunications network has an outstanding place among the jobs to be done by the turn of the century, partly because the rate thus far, according to Figure 1, is not satisfactory and partly because it should prove that a value greater than the 30 per 100 density can be achieved by the end of the century. If we reach a density of 17 per 100 in 1990 then, according to the curves which can be seen in the figure, the task is not impossible in principle; we would only have to increase the annual development rate to 5 percent. Practically, however, this means that manufacturing, construction, assembly and installation performance will have to be increased to more than three times the present value by the last plan period. A thorough study should be made of, for example, the development methods of Bulgaria and Greece, because it is not probable that in these countries an increase in personnel would result in the extra performance. Nor can we count on an increase in personnel here after 1995.

Together with the idea of social progress, in a paradoxical way, an exaggerated conservatism has come to reign in production. The phenomena of this neoconservatism can be discovered in technical and economic life--we were late in accepting the significance of the increase in petroleum prices, the spread of electronics to every area of life, the importance of quality work, and the economic and social significance of a shortage economy and the lack of telecommunications. Somehow we got hung up in the spell of the "Hungarian economic miracle" of the 1970's and believed it would last forever. We always seek the source of the troubles in external circumstances outside of ourselves.

The artistic projection of this conservatism is the so-called nostalgia wave which hides a lack of ideas among the creators and covers a lack of understanding of our age among those who accept it. I mention this because this phenomenon has been projected to every area of culture and work performance.

3. The Forced Path, the Developmental Conception

In the past every technical revolution has brought in its wake a profound re-ordering of society and of economic life. Now the situation is turned around for us. Until the turn of the century the transformation of society--the substantial deterioration in the ratio of workers and dependents--will take place independent of the spread of electronics. But the possibility of using the new technologies puts in our hands a weapon with which we might turn the transformation in a favorable direction which, later, might reverse the present downward trends. So, in essence, one cannot talk about a scientific-technical revolution; rather, the late recognition of the necessity of applying it can mean for us a change, a revolutionary transformation.

Electronification in itself does not solve either social or production problems. Lacking a suitable intellectual and material environment the significance and utility of electronification can be reduced to a minimum, can become ineffective and in the ultimate case harmful. On this basis we must point out a few social and production factors the unsolved nature of which endangers efficiency so that the settling of them should be treated as a prerequisite for the spread of electronification.

These factors can be listed in two main groups; in the first are those which are very largely human characteristics, in the second are those factors which are basically of a material character. Among the latter we must include two problems of a planned economy which influence management possibilities disadvantageously.

Human Factors

a. Deficiences of the Level of Training

A significant part of the population has hung up at the lowest level of literacy; they do not become readers, they remain outside the frameworks of cultural life, and money and alcohol are their measures of value. At this stage the use of present technologies is questionable and the adoption of more demanding technologies is impossible. A general raising of the level of knowledge is necessary not only for production reasons but also for cultural ones, in the interest of improving the quality of social life. Human knowledge, understanding and practice are those parts of the national wealth which can be increased most economically.

b. The Devaluation of the Value of Training

At present the human value of human beings makes up about 45 percent of the national wealth (Table 3) and this value is falling naturally as a result of the decline in the population and the aging of it; and the devaluation of

intellectual work is producing an artificial decrease. More value should be attributed to intellectual capital, as the most essential element of the national wealth, so that the level of training will rise in a natural way and become an effective production factor.

Table 3. An Estimate of the National Wealth Based on a Talk by Dr Ferenc Kozma, Economist, Given on Television 13 September 1983

Category	Value in Billions of Forints	Percent Distribution
Natural assets	1,200	15
Of this:		
Producing land	800	10
Mineral deposits	400	5
Material goods	3,200	40
Of this:		
Directly producing goods	1,440	18
Production infrastructure	640	8
Dwellings, institutions	1,120	14
Human assets, total	3,600	45
Total	8,000	100

Notes:

1. The talk did not deal with the value of idle reserves. According to an article by Nandor Bognar in the 10 Sep 83 MAGYAR NEMZET the combined value of idle raw materials, parts, semifinished and finished products is 600 billion forints.

2. The talk did not mention the historical and artistic assets either; according to estimates these can be put at 200 billion forints.

c. The Lack of a Work Culture

This appears directly as deficiencies in special training and work organization but in reality it has more profound, general cultural causes, a failure to make demands. In this area we have reached the point where if, for example, we must build a hotel for foreigners we have to import the materials, the work chiefs and even the workers themselves.

d. Mass Media Deficiencies

Today, when a large part of the population has experienced everything through travel or knows everything on the basis of foreign radio and TV broadcasts we cannot maintain delayed and one-sided information media. Failure to provide information is accompanied by apathy.

e. Information Management

In production, services and state administration the uncertainty to be eliminated by it and calculating the economic result to be achieved determine the volume, processing mode, transmission speed and storage of the necessary, good quality information. A large proportion of intellectual activity can lay the foundations for management, for the system of necessary tools.

Material Factors

g. Lack of a Telecommunications Network

The first chapter outlines our backwardness in this area and the losses deriving from it. For example, the lack does not make possible the organization of extensive data transmission services and thus, for example, modern inventory management or the harmonization of intellectual work or access to data. With the partial spread of new services the overwhelming part of the provinces can get into an increasingly disadvantageous situation which in the final analysis can result in ruining the enterprises affected.

h. The Shortage Economy

Whether natural or artificial, shortages hurt work discipline, the utilization of machines and the economicalness of production; over the longer term they make it impossible to use expensive machines and robots controlled by microprocessors, increase transportation costs, etc. and increase the uneconomical nature of production.

i. Idle Reserves

According to some estimates the total value of idle materials, parts, semifinished and finished products in the country reaches 600 billion forints. The interest burdens, storage costs, etc. of this gigantic sum, independent of the costs shown, consume a significant part of the national income. Organized services on a telecommunications network could provide a possibility for reducing this.

j. The Superabundance of Waste

Waste in every area is great but it is most striking in the area of construction where quality is largely unacceptable and where the manpower and money needs for repairs and supplementary work are becoming obstacles to development. As a result of the lack of skilled training the efficiency of maintenance work is low also.

k. Management Deficiencies

In principle the goal of the investments should be the creation of more telephones, dwellings, surfaced roads, etc. The interest of the planners, investors, contractors and operators goes in the opposite direction. Achieving lower costs would not be advantageous for any organ, nor is it an interest at

the national economic level because in such a case it would have to provide a larger goods base for the given investment allotment.

In our present management system the sums available as investment and maintenance allotments cannot supplement one another and are not connected with one another. Remainders cannot be carried over from one year to another and this circumstance makes the plans unstable. Similarly, wages also constitute an independent money category in enterprise management. There is no internal convertibility of the forint.

4. Providing for the Development of Efficient Electronification, Creating the Prerequisites, Regulatory Processes

It appears clearly from what has been said in the preceding chapter that we have gotten onto a forced path where there is now no choice but to take a course in the area of production, state administration, trade, transportation, etc. where applications substantially more effective than the present techniques come increasingly into the foreground.

The industrial and social background are not adequately prepared to receive modern technology. But that relatively small stratum which has developed on its own in many respects could be made suitable, under appropriate circumstances, to prepare to receive and then to adopt the new techniques.

The adoption of electronification, although requiring substantial material expenditures, is not primarily a financial or investment problem; more precisely, we must provide a suitable level of the human, intellectual environment for its adoption, because if the prerequisites of this nature are not taken care of then the effectiveness of the new techniques cannot be expected.

So in essence we must provide a degree of harmony between man and tools at least as high as existed earlier between man and the steam engine or between man and electromechanical equipment. Coexistence with these systems and understanding their workings is a long process, one or two decades. The development of coexistence with electronics and microelectronics differs qualitatively from the preceding epochs because the new technologies will invade every area of life--production, transportation, trade, state and enterprise administration and housekeeping--and the use of this equipment requires a high degree of understanding at every level.

A transformation of a significance similar to the spread of electronics took place in the past 30 years in the construction industry where new materials--synthetics, panels, various covering and insulating materials, new assemblies, etc.--appeared along with the traditional materials, but creating the harmony between man and tools failed, as a result of which the level of our construction industry has fallen from the earlier good medium level to a minimal one.

It is difficult to develop a flow chart depicting the creation of the prerequisites for electronification but in any case one can imagine two parallel lines of action.

A reform of the human order of values constitutes the first main line. Table 3 provided an orientation concerning the present components of the national wealth of the country. The estimate of the human assets among these items, although it cannot be free of subjective factors, is relatively low and in the future it could decrease for objective reasons, because of the circumstances discussed above.

But the decrease in the human assets is not an unstoppable process, it could even be prompted to increase. In his work titled "Slowing Time" Andras Brody, emphasizing the difficulties of evaluation methods, points out that the wealth accumulated in human beings in the developed industrial countries surpasses seven times the capital invested in tools of production and is more than double the statistically recorded, tangible national wealth.

If we look at the data in Table 3, even taking into consideration the uncertainty of the data, we can establish that for us this human value is very low and hardly reaches 50 percent of the general data for developed capitalist countries. But one can also conclude from this the possibility of a substantial augmentation of the human assets.

It is worth turning attention to the pertinent data for the United Kingdom, which occupies a medium position among the developed industrial countries but has a traditionally good work culture. According to these data in 1984 only 10 percent of the manufacturing enterprises which could be considered made use of microelectronics and even in those branches of industry where this would be absolutely necessary (textiles, paper and foodstuffs) the extent was only 18 percent. These data indicate a substantial growth compared to the 11 percent for 1981 but it can be established that the lack of professional training and suitability did not make a swifter pace possible.

Figure 3 is intended to give a picture of the link between solving the prerequisites and the spread of electronics. Even if not to scale this sketch illustrates the substantial growth in total value with an increase in training or an elimination of the deficiencies in human assets. On the side of material prerequisites the figure shows that with the development or growth of the telecommunications network and with a narrowing of the limiting effects in the case of the other material prerequisites a possibility opens up for making electronification complete.

Among the material prerequisites, as we pointed out earlier, a crucial role from the viewpoint of all services is played by a basic telecommunications network having suitable transmission paths. The role of this system is expanding in the area of informatics. While the telephone, telegraph, telex, etc. systems providing traditional services belong in the sphere of the productive infrastructure, thus participate in production only indirectly, the system becomes a direct productive force in the chain of intellectual work--information processing, information transmission and information use.

Electronification can be understood as innovation on a national scale. In this process, which in essence necessarily constitutes a unity, centers do develop to a certain extent, primarily from the viewpoint of planning and execution,

but the effect of these centers on one another or their link with one another cannot be ignored.

The first innovation center must be telecommunications, raised to be one of the prerequisites, on the basis of its role in the development of the people's economy.

The investment costs are not great, relatively speaking, to create those transportation, stockpiling, commodity distribution, etc. data transmission links which ensure substantial energy savings and a reduction in interest losses. In a favorable case the investment costs for these systems could be paid back in 1-1.5 years.

Centralized support systems will have an outstanding role among the information systems; such systems could ensure a substantial saving in manpower.

In essence a complete information system will be the productive infrastructure for electronified industry. Lacking this the electronification of the producing branches cannot be solved effectively.

As long as we do not have at least an orienting picture of the size of the information systems and of the demands to be made of them we cannot prepare a program for the electronification of industry and agriculture on the possible and necessary scale. As a first step, on the basis of this, we must map the various branches of industry, mining and agriculture, the service branches and state administration from the viewpoint of needs and expected results.

A survey of needs is essential from the viewpoint of the communications engineering and precision engineering factories as well because only on the basis of the necessary equipment and parts figures can they work out their own developmental programs. When working out these programs there will also be an outlining of cooperation within CEMA and of the frameworks of cooperation with capitalist enterprises.

Biographical Sketch

Karoly Borsos graduated from the engineering school of the Nador Jozsef Technical and Economics University in 1935 and completed the Postal Engineer Course in 1936. Following this, until his retirement in 1972, he worked in the areas of network construction and installation and then planning and development. Since 1972 he has dealt with problems of long-range planning and the economic problems of telecommunications. He has published numerous professional articles domestically and a few abroad.

FIGURE CAPTIONS

1. p 51. Development of the telephone density value for several countries after achieving a density of 1Ø per 1ØØ. The year after the name of the country is the year it achieved 1Ø/1ØØ; percent indicates the annual development. (The correct year for Hungary is 1974.)

2. p 52. The average value (%) between 1974 and 1978 for the sums turned to development of telecommunications from the GNP of several countries and the per capital gross production value in 1982.

3. p 55. The link between the development of electronification and the provision of the prerequisites, on the one hand, and the growth of the value of the GNP. [A dotted line indicates the turn of the century; below this, to the left, are the material prerequisites and, to the right, the human prerequisites; the expanding cone is made up of, from the core outward, robot technology, industrial electronification, informatics and traditional production.]

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REMOTE CONTROL SYSTEM FOR RADIO RELAY CHAINS

Budapest HIRADASTECHNIKA in Hungarian No 2, Feb 86 pp 60-64

[Article by Ferenc Vadaszi, Orion Radio and Electric Enterprise: "Remote Control System for Radio Relay Chains." Manuscript received 3 May 85. The first paragraph is the Hungarian language summary.]

[Text] Summary

The article deals with a description of the TK 161/16 remote control system manufactured by the Orion factory. It breaks a detailed description of the system into two parts, a description of the remote control center and of the automatic station equipment. Both the center and the automatic station equipment carry out a number of tasks simultaneously; for this reason a time diagram illustrates their operation.

In general radio relay chains are made up of unsupervised stations so, in order to reduce down-time to a minimum, it is absolutely necessary that service personnel are immediately informed of the location of a failure and if possible of the type of failure.

Failures--according to the generally used definitions--can create three types of alarm conditions: urgent and non-urgent maintenance alarms and an out-of-service alarm.

If there is only an out-of-service alarm at a station this indicates that the connection is partly or completely broken, but the failure to be repaired is probably not at this station but at another station in the chain.

The non-urgent maintenance alarm is produced in the event of a failure of the reserve equipment. So at such times there is no break but there is a failure either at the station in question or at a neighboring station which must be repaired because another failure in the operating equipment can cause an immediate break in service.

Finally the urgent maintenance alarm indicates a failure to be repaired which has caused a break in the connection.

With the aid of a remote control system used for a radio relay chain one can establish what type of alarm condition exists at which station and also--to a degree corresponding to the capacity of the system--what part of the equipment is causing the alarm. Before going into detail on this, however, we must briefly review the structure of the remote control system and the chief aspects of its operation.

The remote control system consists of a remote control center and groups of station remote control units. The remote control center should be located at a central station from the viewpoint of servicing the chain or the section of the chain being observed. Supervisory personnel must be kept here permanently so they can take action for repairs immediately in the event of a failure. The center is an independent little unit which can be located right next to the equipment or in premises further from it. The station unit group is located in the radio frequency unit. This unit evaluates the "queries" coming from the center and produces the "response" sent; it sorts the alarm signals coming from the various units of the station and inserts them into the "response." Naturally one also needs circuits for the service channel which pass on the remote control signals, but we will not include these in the group of station remote control units.

The TK 161 remote control center manufactured by the Orion factory can control 16 stations, more precisely it can maintain contact with a maximum of 16 station unit groups.

The model number of the remote control center gives the maximum capacity of the system: the number of stations which can be controlled is 16, the number of remote commands which can be given to the controlled station is one, and the number of information signals arriving from one station is 16.

This remote control system is manufactured primarily for remote control of radio relay chains suitable for transmitting telephone speech on a small number of channels. All that is needed to operate the system is a remote control channel located in the radio frequency equipment. In general radio frequency equipment has a one-plus-one link redundancy. In the event of a deterioration in transmission conditions or an equipment failure the switch-over is automatic and there is practically no interruption in the connection. The remote control units located in the radio frequency unit receive the signals coming from the telephone multiplex and other auxiliary equipment.

One or two station unit groups can be used at a branching station depending on whether we want to learn the condition of the parts of the station in a more abridged form or in more detail. If one unit group is used we speak of a "single call number" structure and if two are used we speak of a "two call number" structure. There are always one each unit groups at the end stations. In this way a maximum of 16 stations can be controlled with one center if the intermediate stations have a single call number structure or, for example, one can control two end stations and a maximum of seven intermediate stations if we use the latter in a two call number structure.

Thus, with a single call number structure, the remote control system regards a repeater or branching station as a single station (corresponding to reality) but with a two call number structure it acts as if the intermediate station were two independent end stations. So in the following we will mean by station a station remote control unit group which belongs either to one end station or to a single call number intermediate station or we will mean a station remote control unit group which belongs to one half of a two call number intermediate station. In the case of a longer chain one can decide on the basis of local conditions how many independently controlled sections the chain should be broken down into, that is how many centers must be used. It is not always useful to use the maximum number of controllable stations, considering local service factors, the transportation conditions and the permissible repair time.

Remote control is a "query-response" system. The center sends out the "query" to all stations belonging to it in a series one after another. The query is a serial code which contains the address of the queried station. Then the queried unit group "responds" to the center. The response is a serial code which includes the address of the station (so that the center can check that the response came from the station queried) and data pertaining to the "good" or "bad" condition of the station. Thus the center is constantly checking the condition of the chain and the condition of each station is indicated by LED diodes; the center stores the data pertaining to the condition of the stations and if the condition of any station changes a common alarm is given. This alarm is the illumination of an LED and the closing of a contact. An external alarm, for example a sound alarm, can be set off by the latter. Thus the supervisory personnel are immediately informed of every failure.

The remote control system is basically service-centric. Thus only in the event of a maintenance alarm does it show the station as bad; in the event of a service interruption it shows it as good. In addition, from the viewpoint of the good-bad classification, it makes no distinction between an urgent and non-urgent maintenance alarm, for in both cases there has been some sort of failure which must be repaired, so service activity must be initiated. Naturally the failure can be defined more precisely with the aid of the remote control system too; one can determine whether the maintenance alarm is urgent or non-urgent, etc. But to do this the supervisory personnel must direct the center to give a detailed readout.

The process whereby the failure is noted and defined is as follows:

If there is a failure in the chain (or in the section of the chain being controlled) then a maintenance alarm is given at one or more stations. The center shows this station or these stations as bad and gives the common alarm.

Upon hearing the sound alarm the supervisory personnel go to the remote control center and see immediately from its LED's which station or stations have failed. (If the connection has been broken they see this too but--as we have said--the probability of this is very small.) The sound alarm can be turned off with a push button.

The first task of the supervisor is to determine whether it is an urgent or non-urgent alarm, so he can decide on the urgency of the repairs. The second task is to determine at which station the failure has taken place or where the service team must be sent to repair the failure. The next useful task is to define the failure within the station or to determine which unit or unit group therein has failed. This will help in the selection of reserve units and instruments to be sent out if the repair must be made at a station difficult to approach--for example, in some sections this can be done only on foot.

For all these tasks the remote control system offers possibilities for a detailed indication of the condition of any station. To do this the supervisor--using the appropriate push buttons of the remote control center--must call up the desired station as a result of which the center will give a detailed picture of the condition of the station by means of 16 red-green LED pairs. One can establish from this whether the alarm is urgent or non-urgent and what part of the station the alarm comes from. In addition to these things it indicates an out-of-service alarm.

In many cases it is simple to determine at which station the failure to be corrected is located; in other cases it is more difficult or cannot be determined with complete certainty. In general one must look at the detailed condition of several stations to be able to determine or make probable the site of the failure. For example, if a transmitter fails a maintenance alarm is set off at both the transmitting and receiving stations. Only with a detailed analysis of the condition of both stations can one determine that the transmitter of one of the stations is at fault and this is why the receiver of the other station (which is almost certainly good) is giving an alarm, so the repairs must be made at the transmitting station. Naturally there can be much more complicated failures which are more difficult to define. To determine the location of these one must know the alarm system of the station frames and units.

The TK 161/16 Medium Capacity Remote Control System

Figure 1 shows the general view of the center of the system. On the right side of the front panel, left of the inscription "Station Address", under and above the push buttons "1" through "8" are the 16 green-red LED pairs which indicate the good or bad condition of the 16 stations being checked. The 16 stations are divided into two "zones" with 8 stations each, the LED's of the "A" zone are above and those of the "B" zone are below. These LED's can be in the following states:

--only green illuminated if the station is good;
--only red illuminated if the station is bad;
--both illuminated if a response is not coming from the station;
--both dark if no structured station belongs to the LED's (the structure can be programmed with short circuits within the center).

The LED's can have an additional three states, but these can occur only if the supervisor has called the station. The station can be called by pushing the button for the zone ("A" or "B") and the button for the serial number ("1" through "8") of the station, for example "A 3". Then the LED's of the station

called illuminate in an interrupted way with the same meaning described above. Thus:

--only the green flashes if the station is good;
--only the red flashes if the station is bad;
--both flash if no response comes from the station.

This flashing shows the center which station was called, or which station's condition will be indicated in detail. Sixteen green-red LED pairs on the left side above the inscription "Indicators" give the indications in detail. Before we describe the significance of these LED's let us review the role of the LED's and push buttons not yet mentioned.

In order to call another station or display detailed data on it we must first erase the detailed display for a station called earlier. The push button designated "R" serves this purpose. Thus, after it is pushed, the detailed readout of the condition of the station called ends; all the LED's beside "Indicators" go out and the two LED's indicating the good or bad condition of the station shine continuously, they do not flash. Then one can call the next station--in the manner already described.

We have already mentioned the common alarm of the center; in the event of a change in the good or bad condition of any station the center gives a common light and external (e.g., sound) alarm. The light alarm appears broken down into zones; if the condition of a station belonging to the "A" zone changes then the red LED beside the upper "General Condition" inscription lights up, if the change is in the "B" zone then the similar lower LED lights up. The common alarm does not end without external intervention, it is maintained continuously independent of what further changes take place in the chain, even if, for example, the failure ends and every station is good. The alarm can be turned off only by pushing the button marked "S". Thus, when the button is pushed, the LED illuminated due to the earlier change goes off, the external (sound) alarm stops and the center memorizes the changed condition of the stations. Then a change relative to the new condition--e.g., repair of the previously bad station or failure of another station--triggers the common alarm.

In addition to its above effect (erasing an alarm) the "S" button has another function as well, fixing the remote command. A remote command can be sent to any station with the aid of the remote control system. To do this one must first call the station, as when we are requesting detailed data, then one must press the "B" button left of the "Command" inscription and the "S" button simultaneously if we want to give an IN command, and the "K" and "S" buttons must be pressed simultaneously if we are giving an OUT command. The fixing function of the "S" button protects against giving a command accidentally.

Let us return to the detailed readout of the condition of the station. Each of the 16 LED pairs above the "Indicators" inscription indicates one datum of the station, in general a good condition by the green and a bad condition by the red LED. As has been said the same LED pair indicates a different datum in the single call number and two call number structure.

Let us look first at the two call number structure. We use this for end stations and to indicate half of the branching stations belonging to one speech direction.

The Z1 LED pair gives an alarm in the event of any maintenance alarm for the station. Thus it never gives an alarm alone; at least one other LED pair always gives an alarm too, the one in which the maintenance alarm has occured. In general this alarm means an urgent maintenance alarm, because a non-urgent maintenance alarm arises only in the event of a failure of one of the transmitters and/or one of the receivers.

The Z2 LED pair can indicate a smaller order urgent maintenance alarm.

The Z3 and Z12 pairs can indicate an even smaller urgent maintenance alarm.

The indication of the Z13 through Z16 LED pairs is different, but here also the green LED indicates a good condition and the continuous light of the red LED indicates an alarm condition. Since the condition of two transmitters or two receivers must be shown at a repeater or branching station the indications of the Z13 LED pair are the following:

--only the green LED is illuminated, both transmitters are good;
--only the red LED is illuminated, both transmitters are bad (or there is an urgent maintenance alarm);
--the green and red LED's illuminate alternately, only one transmitter is bad (a non-urgent maintenance alarm).

The Z14 LED pair shows the condition of the two receivers, or more precisely of the two signals received, in a system similar to that for the Z13:

--only the green LED is illuminated, both receivers (reception) are good;
--only the red LED is illuminated, there is an urgent maintenance alarm in both received signals;
--the green and red LED's illuminate alternately, only one of the received signals is faulty (a non-urgent maintenance alarm).

The Z15 and Z16 LED pairs indicate another out-of-service alarm.

If all the intermediate stations of a chain have a single call number structure then it may be more convenient for the supervisor if the end stations indicate in the same system as the branching stations so, by means of a short circuit, it can be arranged that the end station also indicates the alarms according to the single call number schema. The automatic remote control equipment at each station together with the FTK 161/16 remote control center make up the TK 161/16 remote control system.

The automatic remote control equipment is connected to the remote control center by two-way data transmission channels of a communications chain suitable for transmitting signals at a speed of 100 Baud.

The center can control a maximum of eight stations in each zone (A and B). It calls up the stations one after another, the one addressed responds, then the center queries the next station, it responds, and so forth.

The time devoted to checking all 16 stations of zones A and B is called the complete remote control cycle; the time division of this can be seen in Figure 2. When in operation the remote control cycles follow one another constantly automatically. If the communication chain does not contain 16 stations the cycle time can be reduced optionally (that is, the number of stations checked can be reduced).

The complete remote control cycle is broken down into partial cycles, the same as the number of stations checked (Figure 3). A partial cycle begins with the "query" of the center, this is 16 bits long (but the time varies depending on the information content of the bits); then the remote control center transmits synchronizing "Ø" bits for a longer time.

In the meanwhile the queried station begins to answer, first transmitting a 2 x 16 bit "Ø" series. Then comes the part containing the response information which can be either 16 or 8Ø bits long--on the basis of a description to be given later.

One can see in Figure 4 an imagined version of the remote control cycle:

--The station designated A1 responds to the query briefly with 16 bits.

--No response comes from station A2, the center goes on to A3 after a waiting time of about 5Ø ms.

--The query arriving at station A3 contains an instruction, put in manually by the operator, according to which the station should provide not only summary information but also a detailed evaluation of the parameters being checked. The part of the response containing the information has changed to 5 x 16=8Ø bits instead of 16 bits.

--The center calls up the stations in sequence up to B8 and then returns again to A1.

Figure 5 shows the parts of the 16 bit query and the meaning thereof.

The query of the center and the responses sent by the stations contain information coded in the "Ø" and "1" form. The parameters being observed by the automatic devices are evaluated by the device as good if their value is at the TTL "Ø" level or as bad if at the TTL "1" level, or if interrupted.

The circuits of the center and of the automatic equipment operate with TTL logic while the code put on line is pulse width modulated. The remote control signals are transmitted in the service channel by frequency shift keying. Figure 6 shows the system of line coding.

Figure 7 contains the query sent to station A1 to illustrate line coding.

The remote control center calls the individual automatic devices at the station one after another--addressing them with their own call numbers--and then the automatic devices compare the code of the center with their own call numbers and only the single station addressed by the center responds.

The response--depending on whether the center is asking simply for a short summary report or is asking for all observed parameters in detail--is 3 x 16 or 7 x 16 bits long. Figure 8 shows the composition of the signal series for a short and a long answer.

Biographic Note

Ference Vadaszi completed his studies at the Kalman Kando Communications Industry Technikum in 1958. He worked in the microwave manufacturing planning department of the BHG [Beloiannisz Telecommunications Factory] until 1965. After the readjustment of factory profiles he went to the Orion Radio and Electric Enterprise as a technological expert where he deals primarily with manufacturing planning for remote controls for various types of radio relay equipment. At present he is technical leader of the micro final testing shop of the Orion factory.

8984
CSO: 5500/3012

TRANSFER OF HIGH-LEVEL COMPILER PROGRAMS BETWEEN Z-8Ø BASED MICROPROCESSOR SYSTEMS

Budapest HIRADASTECHNIKA in Hungarian No 2, Feb 86 pp 65-67

[Article by Gabor Hosszu, Electrical Engineering School of the Budapest Technical University: "Transfer of High-Level Compiler Programs Between Z-8Ø Based Microprocessor Systems." Manuscript received 3Ø Apr 85. The first paragraph is the Hungarian language summary.]

[Text] Summary

Microprocessor systems are widely used in our country to control industrial and measurement processes. Because of the fast operation requirement for these they must be operated with machine code programs, which makes their application difficult. Only the use of high-level compiler programs would offer a solution. Such compiler programs already exist for a few machines but in general these operate in only one system each. If they could be transferred from one to another it would improve the utility of these systems. The article describes a procedure which makes a Hungarian computer, a computer little known but outstandingly suitable for process control, capable of accepting compiler programs. The steps for practical realization and possible paths for further development are described.

Z-8Ø microprocessors have been used in an ever wider area in our country in recent years. One of the areas in which they are most extensively used is control of measurement and industrial processes. The personal computers which can be obtained commercially are not usually used for such tasks. These computers serve primarily personal purposes and their systems are structured to this end. And their high prices do not make possible their use in, for example, industrial processes. Other types of Z-8Ø based computers can be obtained also; their peripheral handling is simpler and their prices are lower than in the case of the personal computers. Their disadvantage is that they are known in a relatively narrow circle so very few finished programs can be obtained for them. A characteristic representative is the PDV-38 (Programmable Digital Control) computer developed in Hungary. Its defect is that it can be programmed only in machine code. The BASIC language, easily mastered, would be better for users less practiced in programming. This could be done if the operating system running on the computer were expanded with a BASIC interpreter or compiler. A BASIC interpreter executes the program written in

instruction by instruction, which greatly reduces the running speed so that usually execution of a BASIC program with an interpreter is not suitable for process control. A BASIC compiler transforms the source language program written in into machine code which can be executed much more quickly. So it would be worth creating a compiler program for the PDV-38. The best method for this would be use of a compiler program running on another Z-8Ø based computer. So the PDV-38 would have to be made compatible with another computer in regard to the compiler program selected. Compatibility, naturally, can be realized only within the limits deriving from differences in the hardware of the two machines. We should select as a system one where high-level compiler programs run already, the ZX Spectrum personal computer, because of the especially large compiler assortment existing for it. In this way we have to know the characteristics of only one system to transfer several compilers. More than one compiler program is advantageous (as we will see in point 3 of the article) because different compilers should be used depending on the task to be solved. Choice of the ZX Spectrum is also justified by the very large amount of professional literature pertaining to it--compared to other personal computers. The system programs to be transferred and the monitor program of the ZX Spectrum itself, in ROM, are legally protected products so naturally the transfer is possible only with permission.

1. Conditions To Be Able to Use A Program on Different Computers

The compilers themselves are machine code programs. There are three conditions for their use in a new system:

I. The machine code instruction set for the receiving system must be compatible from above with that of the original system. In the case of the above two machines this is always true because of the identity of the central units.

II. Memory size and the memory map must be compatible.

III. We must study the connecting surfaces of the compiler program with the monitor program of the receiving system, for these same surfaces must be provided in the receiving system (in the PVD-38). The compilers make contact with the ZX Spectrum monitor program in ROM via the so-called system variables (SV) and while running they make use of some routines of the program with subroutine calls. So it becomes necessary to do a detailed analysis of the monitor program. At the hardware level the peripherals of the PDV-38 are not in general identical with those of the original system. The PDV-38 peripherals are handled by the appropriate routines of its monitor program, so one must also know the operation of these.

2. The Monitor Program of the Original System

One of the characteristics of the ZX Spectrum monitor program is that it makes wide use of system variables for data traffic among its routines. The first task was a study of the system variables, but even among these the so-called indicator type system variables are of outstanding importance. It is characteristic of these that every single bit of them has independent significance.

3. Programs Realizing Compiler Functions

Since the final goal of our task is facilitation of the preparation of machine code programs serving process control, which can be achieved primarily with compilers, we must study every available compiler running on Spectrum and select those best suiting our purpose.

A Few Characteristic Properties of the Most Suitable Compilers

FULL COMP

This prepares extraordinarily slow machine code programs, but it accepts practically all Spectrum-BASIC instructions. So it is suitable for translating any BASIC program.

BASIC INTEGER COMPILER

This has a limited instruction set. It can work only with whole numbers. Its advantage is that it produces the fastest programs of all the compilers known.

Comparison of MCODER and SUPER C

In general MCODER is 5Ø times faster than BASIC, but in the case of some programs it can even be 9ØØ times faster. SUPER C produces programs which run a little slower. MCODER can also run on the 16K Spectrum, SUPER C only on the 48K version (Figure 1). Process control programs can be prepared in the Pascal, Forth, etc. languages as well as BASIC. The best known among the Pascal compilers is the HP 4TM16, among the Forth languages there are Sp.-Forth and FP-5Ø. The chief difference between the two latter is that Sp.-Forth has only fixed point arithmetic; FP-5Ø also has floating point, which slows it down, but it should be used for more precise computations.

4. The Receiving System

In its basic configuration the PDV-38 developmental and process control system contains the following units: power unit, CPU card, system program store plus EPROM programmer, 48 K RAM, TV-, tape recorder- and printer-interface units. Its memory distribution can be seen in Figure 2.

The PDV TV program is very simple, partly because the machine can produce only a black-white picture, so the program does not have to deal with inserting colors, and partly because the writing of the characters is done by the machine. So the size of the screen memory area is much smaller than that of the Spectrum, for example, for it consists only of as many cells as there are character positions on the screen (1 K bytes). The character set which can be written out is greatly limited; it can write out only the printable ASCII character set (with the exception of lower case). Cassette handling is simpler than that of the Spectrum, but it is just as reliable.

Figure 1. Memory Division of SUPER C and MCODER

Ø 16384 32768 54ØØØ 65535

ZX Spectrum ROM	TV, Printer and SV area	The com- piled machine code program	SUPER C work area		Not used
ZX Spectrum ROM	TV, Printer and SV area	Additional compiled machine code programs (reserve area)	The first compiled machine code program	M C O D E R	Not used
ZX Spectrum ROM	TV, Printer and SV area	The com- piled m code pro- gram	M C O D R R		

23733 28970

16 K RAM

Figure 2. The Memory Division of the PDV-38

Area reserved for user RAM	The PDV-38 monitor program EPROM	TV plus auxiliary stores RAM

48 K 62 K 64 K

Figure 3. Use of PDV-SP With a Compiler

PDV-SP RAM	Free area RAM	Sa Vr e a	Compiled machine code routines RAM	com- piler RAM	PDV 38 monitor program EPROM	TV plus auxil. stores RAM

Ø 14446 23733 49152 65535

5. Realizing the Compatibility

In order to make any of the compilers mentioned capable of being run on the PDV-38 it is necessary to transfer a number of the routines of the Spectrum monitor program to the PDV and fit them there to the surfaces offered by the PDV hardware. Realizing this is extraordinarily complicated considering that the peripheral management of the two machines is entirely different and, in addition, the structure of the two operating systems is built on different principles.

The PDV-OS is placed in the top quarter of memory; the Spectrum monitor program is placed in the lower quarter. This circumstance gave an opportunity for facilitating the execution of the task in that first I transferred the entire Spectrum monitor program to the PDV, since this program is interdependent in itself and operates perfectly (Figure 3). If we interface the surfaces on the machine side we can work on the PDV and the compiler programs running on the 16 K Spectrum can be run as well. In addition, another advantage of this solution is that we can use the elements of the extraordinarily large system program set running on the Spectrum to facilitate our additional development work.

The only disadvantage is that the two monitor programs occupy half of the memory area. In the case of very many applications this is still all right, because the room available to us to store programs is reduced by only 16 K compared to the Spectrum with 48 K RAM, which is still 16 K more than on the 16 K version. Actually what we get is a "32 K Spectrum" (the PDV-SP). Thus a large number of the programs written for the 48 K machine work on the PDV as well.

A significant number of the system programs use some routines of the Spectrum monitor program while running, so before using these we must see if the routines in question exist on the PDV-SP as well and if so are they suitable, for the Spectrum monitor program must be changed at very many places to fit it into a new machine environment. It was necessary to be careful that its structure did not change. For example, the starting point of the more important routines should remain in place. So fitting various programs written originally for the Spectrum onto the new PDV-SP cannot cause special difficulty in any case. Programs written for the 48 K Spectrum must be rewritten if they use the upper memory area where the PDV-OS is, but in general this means only changing the jump addresses and the data connected with memory size.

The break point service of the PDV-OS could be used well in the course of program development, as could the non-prohibitable interrupt request (NMI) possibility of the Z-80 central unit. The latter does not work on the ZX Spectrum due to a programming error but we succeeded in correcting this on the PDV-SP. (This is also advantageous in later uses of the machine.)

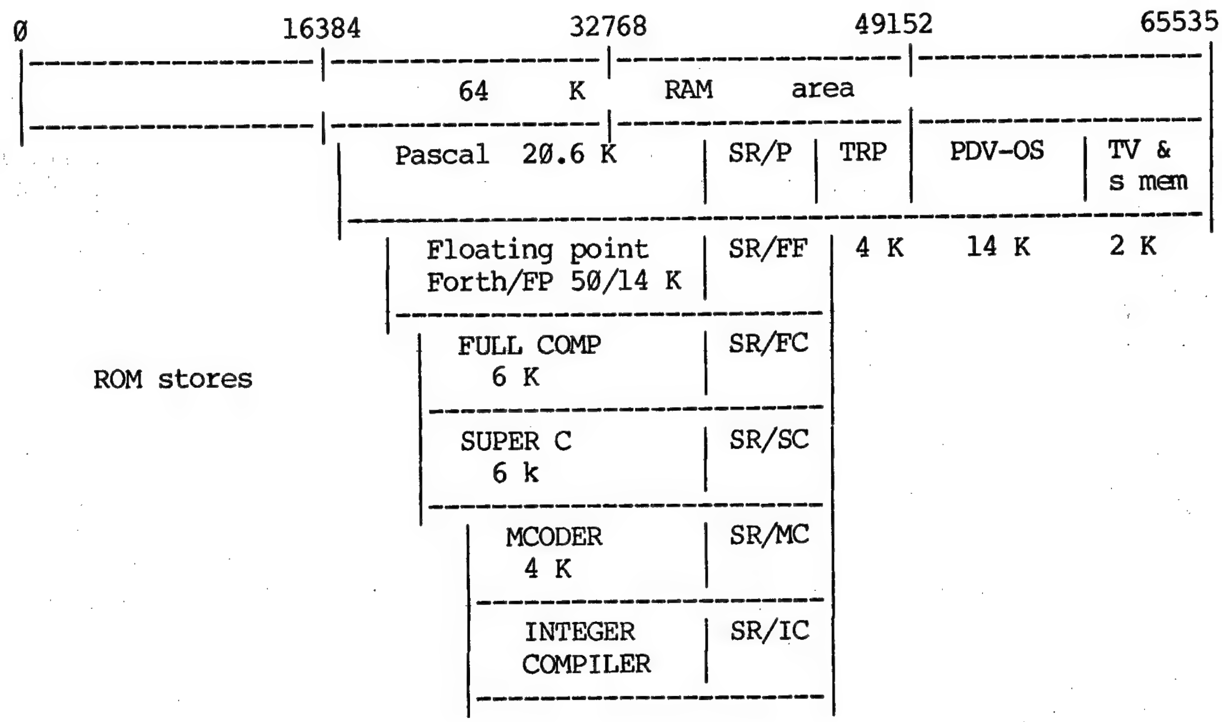
6. Further Development Possibilities

We can free a part of the area occupied by the PDV-SP (above address 14446) for other purposes, because there are enough unused cells in the remaining area of the program where, for example, system variables can be put. With suitable adjustments we can get 9 K extra area for storage purposes.

Thus 34 K memory are available for input of BASIC or machine code programs, only a little more than 6 K less than in the case of the full version of the Spectrum. Despite all the changes we had rather much free room remaining scattered about in memory, partly in the area of the PDV-SP (for we could not change the location of the routines) and partly in the RAM above the PDV-OS. It would be good to expand the PDV-OS with a memory organizing program (TRP) which would store the beginning addresses of the machine code routines, those prepared by the compilers and others written into memory by us. The TRP would watch the memory and sort the machine code routines after every change there so that they left no gaps.

If a larger memory than this is needed we must give up the advantages offered by the Spectrum character of the solution. Then, for every compiler used, we would need supplementary routines (SR), but the PDV-SP would not have to be in memory. One can see in Figure 4 a memory built up according to these ideas. Of the stores placed in the same column only one can be connected to the field being watched by the Z-8Ø.

Figure 4. The Future 64 K Memory Distribution of the PDV



A further significant expansion of memory could be achieved only with the so-called page switching method.

Additional developments will be accompanied by extra cost, so it always depends on the given application which version of the PDV it is most economical to use.

Biographical Note

Gabor Hosszu is a student who graduated in 1985 in the "B" form of the technical physics branch of the Electrical Engineering School of the Budapest Technical University; at present he is a graduate student on a Hungarian Academy of Sciences scholarship. He participated in the Graduate Conference held at the Electrical Engineering School with his independent laboratory work, the theme of which was a study of the transportability of high-level compiler programs.

8984
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MICROWAVE COMPONENTS OPERATING OVER 1Ø GHZ

Budapest HIRADASTECHNIKA in Hungarian No 2, Feb 86 pp 68-71

[Article by Dr Bela Zsoldos, Dr Gyorgy Gerstenmayer and Dr Aurel Sonkoly, of the Microelectronics Enterprise (MEV), and Dr Laszlo Bors, of Orion: "Microwave Circuit Elements Operating Over 1Ø GHz." Manuscript received 1Ø May 85. The first paragraph is the Hungarian language summary.]

[Text] Summary

The article describes a development in the area of microwave technology carried out jointly by Orion and the MEV. In the course of the development we prepared a multi-layer, hole plated, small size 13 GHz transmitting and receiving local oscillator on a Teflon based carrier and a two sided, hole plated 13 GHz image suppressing receiver mixer on a ceramic based carrier.

The Microelectronics Enterprise and the Orion Radio and Electric Enterprise have been cooperating for 7 years in the development of elements for microwave equipment. The MEV makes the auxiliary technological devices (masters, films), microstrips and elements containing resistor networks on the basis of designs developed by Orion.

The two chief areas of the cooperation are development and production of elements formed on ceramic and Teflon based carriers. The elements on ceramic carriers are made by a modification of the thin film technology suiting the purpose; the elements on Teflon carriers are made with a version of the technology for production of printed circuit sheets.

Using the "standard" technology which has been developed and used in manufacturing we make on ceramic carriers one and two sided chips containing micro wiring and resistors; the transmission lines or gaps in these have a minimal width of 1ØØ-15Ø microns. The elements on Teflon carriers can also be one or two sided, with similar minimal dimensions, coated with bright tin or a tin-lead alloy.

The 13 GHz, 2 x 34 M bits per second capacity radio relay equipment now going into manufacture at Orion required a further development of the technology and more demanding technological processing. In the course of the technological

development a step forward was taken in both the ceramic and Teflon carrier elements.

The further development in the Teflon carrier technology took place in several of the elements of the 13 GHz transmitter and receiver local oscillator (Figure 1).

In the case of the crosshatched controlled oscillators and microwave frequency multipliers it was necessary to develop, in contrast to the standard procedure, surfaces gilded on two sides and hole plating of the fiber glass strengthed Teflon in order to form "ground islands" on the active surface.

In creating the coupling-mixing unit the goal was creation of a design without box mechanics where external shielding and the internal shielding of the several conducting lines was ensured.

The solution was the development of a multi-layer structure on a Teflon carrier. The conducting lines are inside an insulating sandwich structure, surrounded by a double line of holes (Figure 2).

The left part of Figure 2 is a drawing of a connecting line where the coupling aperture is 8Ø plus or minus 1Ø microns, so it is a gap which is relatively narrow, to be made with great precision. The lines are surrounded by a double row of plated holes on both sides the task of which is electric shielding. The right part of the figure is a cross section of the coupler-mixer. It can be seen that copper foil provides the lower and upper shielding, the row of plated holes connects the lower and upper ground surfaces.

Figure 3 summarizes the more important technological steps, stressing the operations which deviate from the standard procedure.

Figure 3. Steps in Production of Multi-layer Teflon Microwave Chips

Cutting the base material to the technological dimensions.
Preparing the locating holes.
PREPARING THE INTERNAL GILDED OUTLINE.
PREPARING THE SURFACES TO BE ATTACHED.
Molding.
Drilling.
PREPARING THE HOLES FOR METALLING.
Hole plating.
Forming the figure, galvanization.
Final finishing.

The technological operations done with the Teflon material are preceded by topology design, prepartion of the master drawings for the several layers and perparation of 1:1 scale photos from the enlarged master drawings.

In addition to the actual dimensions of the device the technological dimensions contain a frame for the locating holes and the fittings for the chemical and galvanic operations; this frame is 2Ø-25 mm.

The locating holes ensure the ability to perform the operations accompanying the fitting together (forming the internal layer figures, molding, drilling). The figure is positioned to these and the several layers are placed on one another.

When forming the internal gilded outline attention must be paid to the fact that realizing the necessary gap dimensions and precision with the solid photoresist procedure used to produce printed circuit sheets is difficult to do, so we use a positive photoresist resin 2-3 microns thick applied with a cylindrical photo resin applier. We make a negative of the figure to be produced out of the photo resin and deposit a 2-3 micron thick gold layer by galvanic means onto the surfaces left free.

Following galvanization and removal of the resin this gold layer acts as an etch resisting mask for etching.

In the interest of maintaining dimension precision and contour sharpness we do the etching in a vapor etcher in an etching medium containing an additive to reduce subsurface etching.

As a result of the smooth surface and chemical inactivity of the Teflon it is difficult to attach. The surface must be made a little rough by etching to aid attachment. Complexes of metallic sodium made with ammonia or organic compounds can be used as an etching medium. The etching medium used by us bears the trade mark Tetra Etch, developed by the Shipley firm, and is a material made of sodium containing a naphthalene complex.

After 10-60 seconds of treatment the attachment must be done within 1-2 hours, because the micro roughness produced as a result of the etching "flows" within a short time.

The layers are attached together with hot molding of the Teflon and adhesive foil layers, fitted precisely together with the aid of pins placed in the positioning holes. Molding takes place at a pressure of 160 N per square centimeter at a temperature of 210 degrees Celsius; the course of heating and cooling is programmed.

Drilling the fiber glass reinforced Teflon also requires special care compared to the drilling of multi-layer glass shell epoxy, which can be regarded as standard. In the case of a worn drill or low cutting or thrusting speed the wall of the hole will be uneven or the glass fibers will not break or will come out of the cloth. In the case of a high cutting or thrusting speed the soft Teflon will smear in the wall of the hole and destroy the connection with the internal connecting surfaces.

So the drilling must always be done with a new drill with precisely tested and determined drilling parameters. These depend on the equipment, material and hole size.

Because of the passivity of the Teflon the metalling of the hole walls likewise can be done only after pretreatment or roughing. We perform the treatment with the Tetra Etch etching medium in a manner similar to preparation of the surfaces to be attached.

The metalling of the holes and preparation of the outside outline take place in the manner used in production of two side, hole plated printed circuit sheets.

In Figure 4 we show the internal layer outline (a) of the coupler-mixer and the location of the rows of shielding holes. The dimensions of the entire unit are 118 x 48 mm and it is 2 mm thick.

The further development of the ceramic carrier technology took place with preparation of the 13 GHz image suppressing receiver mixer. Figure 5 shows the theoretical structure of the device. On one side of the circuit, formed on a 1 x 3/4 inch aluminum oxide ceramic, are:

signal and local frequency inputs,
a 90 degree hybrid,
a cut-off resistor (50 ohm),
condensers, and
the low pass filters.

While on the other side are the gap lines and the so-called coplanar lines from two 180 degree hybrids.

The realization of the 180 degree hybrid can be found in Figure 6. The connection between the two sides is produced by metalled holes.

The high precision realization of the 100 micron lines and gaps and creation and metalling of the holes represent the technological novelty.

Figure 7 shows the course of production. Here also manufacture is preceded by topology design, the master drawing and preparation of a scaled photo corresponding to the dimensions of the ceramic carrier.

Figure 7. Steps in Production of Hole Plated Microwave Ceramic Chips

Determining hole locations.
Drilling (with laser or ultrasound).
Creating resistor and contact layers.
Metalling the holes.
Forming contact figure.
Galvanization, etching.
Forming resistor figure.
Etching, cleaning.
Adjusting value of resistors.
Cutting up.
Finishing, packaging.

The drilling technology determines the course of the first technological operation.

The drilling can be done in two ways:

1. With a laser. In this case we can give the location of the holes with coordinates relative to a corner of the ceramic carrier. These coordinates serve to set up the coordinate table of the laser.

2. In the case of ultrasonic drilling we designate the location of the holes by forming the photolithographic figure and position the drilling tool at the designated places visually.

The laser method is suitable from making smaller diameter holes. The disadvantage is that the holes are conical, the diameter on the side of the drilling is 2-3 times the diameter on the far side, and the wall of the hole is so smooth that activating preparation is required before metalling.

The smallest diameter we drilled with ultrasonic drilling was Ø.8-1 mm. Here the breaking of the side of the ceramic not drilled was common.

There are two possibilities for metalling the hole: ceramic metalling and vacuum technology metalling.

We selected the latter because we had the equipment and the experience for that. In this case the metalling of the hole takes place in one operation with the depositing of the resistor and contact layers. In this case we deposit the TaN, Ti, NiCr and Au layers with cathode spraying; this makes it possible for the metal layer to be deposited on the walls of the holes as well as on the surface, this makes them conductive, and so we can thicken them during the following galvanic operations.

Formation of the negative of the conducting figure takes place according to the standard procedure; we perform galvanic thickening by overlaying first the back and then the front, so the thickness of the gold being deposited on the walls of the holes is twice the value deriving from bath spraying.

The other operations are parts of the standard ceramics technology; only the careful control of the conductivity of the hole walls and holes represents a deviation from it.

Figure 8 shows the front and back outline of the 13 GHz image suppressing receiver mixer.

Biographic Notes

Dr Bela Zsoldos graduated in chemistry from the Natural Sciences School of the Lorand Eotvos Science University in 1969. He defended his doctoral thesis in 1971, the subject being study of solid materials with radiochemical methods. Since 1969 he has worked for the Communications Engineering Industrial Research Institute (HIKI) and its legal successor the Microelectronics Enterprise. His work areas have been a study of semiconductor materials with

neutron activation analysis, the technology of and study of printed circuit sheets and thin film hybrid integrated circuits. At present he is chief of the thin film technology main department of the Hybrid Circuit Branch of the Microelectronics Enterprise.

Dr Gyorgy Gerstenmayer obtained his electrical engineering diploma in 1979 in the Electronics Technology Section of the Budapest Technical University. He continued his special engineering studies in day courses on a scholarship from United Incandescent and won his special engineering diploma in electronics technology in 1981. His special area is development of technologies for printed circuits (more narrowly, multi-layer ones). At present he works for the MEV as a technology development engineer.

Dr Aurel Sonkoly graduated from the Electrical Engineering School of the Budapest Technical University in 1972. At the same place he won his digital systems design special engineering diploma in 1978 and his doctorate in 1983. He has worked at the HIKI since 1972 and at present leads the high frequency department of the Hybrid Branch of the MEV where he deals with design and measurement of hybrid integrated circuits.

Dr Laszlo Bors won his diploma in 1961 at the Electrical Engineering School of the Budapest Technical University. In 1961 he went to the BHG [Beloiannisz Telecommunications Factory] to work as a microwave developmental engineer and has done the same work since 1965 at the Orion Radio and Electric Enterprise. In the course of his career thus far he has dealt with various active microwave circuits and with systems technology questions of digital microwave radio relay equipment. At present he is chief of microwave development at Orion as chief of the radio frequency development department.

FIGURE CAPTIONS

1. p 68. Structure of the 13 GHz transmitter and receiver local oscillator.

2. p 69. Structure of the coupler-mixer: a) drawing of a coupling line; b) the multi-layer structure.

3. p 69. [Included in text above.]

4. p 70. Outline of coupler-mixer: a) outline of internal layer; b) the internal layer and the row of shielding holes.

5. p 70. Theoretical structure of the 13 GHz image suppressing mixer.

6. p 70. Realization of the 180 degree hybrid in the 13 GHz image suppressing mixer.

7. p 70. [Included in text above.]

8. p 71. Outline of the 13 GHz image suppressing mixer.

8984
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CONTROVERSY, IGNORANCE SURROUNDING INFORMATICS LAW VIEWED

Sao Paulo VEJA in Portuguese 16 Jul 86 pp 96-103

[Text] Rarely has a subject been presented to Brazil on which so much has been said, so many rivers of ink consumed, such a number of ferociously antagonistic positions have clashed and, above all, at the same time, about which the public has known so little as the Informatics Law. It is a document issued by the government and approved by Congress in 1984, which bans or drastically restricts the activity of foreign companies in the Brazilian computer and electronic component market. It is not only the general public who listens to the babbling and understands nothing. From lawyers to engineers, from businessmen to makers of opinion, from university professors to ministers of state, very few Brazilians of the better strata of society are today capable of saying what the Informatics Law truly determines and what is the actual meaning of the junction of two magic words: "market" and "reserve" which led to the birth of the law.

The same confusion exists around another crucial point: The existence of the government agency that rules over the subject. Under cover of the Informatics Law, which originally was to have protected only the manufacture of micro and minicomputers by national companies, the Special Secretariat of Informatics--SEI--acts and prospers. The SEI, as it is better known, is the public bureau created within the framework of the National Service for Intelligence [SNI] and charged with managing the informatics policy. The thick paste of misunderstanding there is made up on the basis of one basic fact: the frontiers of the SEI know no limits. From the micro and minicomputers stipulated by the law, its powers today extend to everything that is made with some electronic component in its makeup, be it a doll that cries, a blender, an automobile starter or a quality control machine.

Today there is nothing left at the disposal of Brazilians in stores and supermarkets that escapes the vigilance of the SEI, which bases its actions on the articles, particularly their interpretation, contained in the Informatics Law. Despite the great influence of the SEI and the law in the daily life of the country, the degree of knowledge of the people on this notorious piece of legislation borders on zero. It was approved in record time in the Congress back in the government of President Joao Figueiredo by a "leadership vote," which means only by the votes of the leaders of the congressional blocs and not by all the deputies and senators.

Its text simply was not even read by the majority of the legislators who approved it, and today very few of them know where to find a copy of the law they decided was important for the technological progress of Brazil.

Moreover, there is the very complexity, the doubiousness and convulsed writing of the text, which makes it even difficult for President Jose Sarney to understand exactly what that 46-article law, with its annexes, has to say. It survives today without any regulations, although practically all the companies located in the country depend on it for the management of their businesses. Similarly, not even among Sarney's ministers is there agreement as to what the SEI can or cannot do.

A dramatic picture of that situation of almost absolute ignorance as to the basis of "the reservation of the market of informatics," was given last week in Sao Paulo during a small street demonstration promoted by associations of engineers--the first street demonstration sponsored by supporters of the law, who up to now have concentrated their efforts in the press, together with the politicians, and on publicity campaigns to promote their points of view and their interests. In it there was a little bit of everything to attract attention: Led by a band, it had clowns, harem girls, banners, fire eaters and some engineers. On the sidewalks, however, no one understood what was going on. "What is informatics?" asked a citizen when he heard the slogan: "Informatics is ours and so is the talent." Another, asked by a reporter, answered that he heard "something," saying that Brazil "broke with the United States," interpreting in his own way the efforts by the American Government to negotiate with the Brazilian Government the possibility of a greater participation in the national computer market, whether through exports or through partnerships with Brazilian companies. If the parade had chosen the site of the Congress in Brasilia instead of the center of Sao Paulo for carrying out its maneuvers, the scene of perplexity would not have been much different.

"Gap in the Law"

"Fewer than 4 percent of the 548 legislators have an overall idea of the national informatics program," calculates Deputy Luiz Antonio Fayet (PFL-PR). In fact, Congress is not the most ideal place for explaining subjects on the Informatics Law. Of seven legislators heard by VEJA last week, for example, the majority demonstrated a lack of knowledge of even the most elementary questions having to do with the Brazilian Government policy in the field of electronics, such as the period of 8 years given to the SEI for controlling imports of informatics goods and services. There is precisely where the source of power of that agency resides. It can refuse, without giving the requester the right of defense, the authority for importing any component or equipment that has electronic parts in its mechanism. "That is the law with which Senator Roberto Campos was left defending the interests of the Americans," said Deputy Jaques D'Ornellas (PDT-RJ). He could not say, however, exactly which sectors of informatics were prohibited to foreigners by the law he approved. Neither did he know when the date on the prohibitions established by the law would end. According to what he believes, that would happen "in 1994," 2 years after that the law stipulates, however.

Another one who remembers little about the law he voted for is Deputy Carlos Sant'Anna (PMDB-BA), former minister of health. He did not know, for example, what ratio of foreign capital is accepted by the SEI in a partnership with national companies--the so-called joint ventures, one of the items that has caused the most perplexity in the American informatics companies interested in operating in Brazil or in expanding their dealings in the national market. "It is a small thing, less than half," hazards Sant'Anna. Actually the law states that the foreign partner may not have more than 30 percent of the capital and, in addition to that, he will have to integrate his share of the money and gratuitously grant the national partner the technology to be used.

There are exceptions, naturally, although a high degree of knowledge on the subject cannot be expected from a Congress that approved a law with only the votes of the leaders of the two parties. The fact is that Brazil was left with a law that the government and politicians claim unceasingly is "nonnegotiable," but which contains several items on which neither one nor the other has managed to reach a consensus, or even say what its exact meaning is. It is from this root that all the present argument is about and it threatens to bring relations between Brazil and the United States on a collision course and causes Brazilian manufacturers who do not make informatics equipment to complain about what they see as being "an excess of bureaucracy" of the SEI. Actually, the argument began back in 1977, when the government halted imports of micro and minicomputers. The SEI was created in 1979 and the progressive national makeup of computer companies in the country began in earnest. The polemic also began between those who find that process positive, those who condemn it as a factor of regression for the country and the various groups, who between one point and the other defend intermediate positions.

Big Ones in the Field

"Without the Informatics Law, Brazil would not have entered the era of microelectronics simply because there would be no businessmen interested in investing in that area," argues engineer Carlos Roberto de Almeida Gauch, vice president of Prologica, manufacturer of microcomputers in Sao Paulo. "Without a reserved market, there would be no way to compete with the big ones in the field." The president of Elebra, a producer of minicomputers and peripheral equipment in Rio de Janeiro, Mario Ripper, attributes to the reservation of the market the very growth of employment in informatics. "We created 30,000 jobs among the national manufacturers, who now control more than 50 percent of the market," says Ripper. In that leap over the foreign companies, national manufacturers had their strongest ally in the SEI.

Even before the existence of the Informatics Law, which was voted in October 1984, any and all companies with foreign capital were banned from making minicomputers in Brazil; they could only make large computers. That is why the American IBM, the number one company in informatics on the planet, as well as in Brazil, despite legal restrictions, cannot sell its personal computer, the PC, one of its most successful products in the world, while

on the national market there are several copies of that equipment produced by Brazilian firms. IBM protested greatly at the time, but it concluded by desisting so as not to prejudice its interests in Brazil even more. It has been active in Brazil since 1917, concentrated in two factories, several service offices and a sophisticated line of medium-size computers not covered by the market reserve.

Lack of Decisions

Indeed, there are no longer those who question the exclusiveness given by the government to national companies in the sector of small computers. However, there is discussion about the increasing growth of the SEI, the obscure points of the Informatics Law and, above all, the lack of decision by the Sarney government as to what awaits foreign capital. "If a law exists, there is no argument as to whether it should or should not be obeyed," says the new president of Brazilian IBM, Rudolf Christian Pfeiffer, "What is being argued are its regulations." That is where the problem lies, according to attorney Georges Charles Fischer, whose office in Sao Paulo specializes in questions of informatics. "The law in itself is not as restrictive as it is said," explains Fischer. The problem is that the SEI, because of a lack of regulations, rules and interprets the legal text approved by Congress in the light of what it believes is best for the country. Such a situation would not exist if the National Informatics Council--an agency of 23 members, of whom eight are from the private sector--had complied with the letter of the law and regulated it within 180 days as of October 1984.

The result: The SEI is the one who decides, case by case, on the fate of the sector, without the protection of any basic regulation. "It is thus that the powers of the SEI come to border on authoritarianism," says Fischer. "With that structure, important decisions, that are going to benefit or harm large and small companies, are left in the hands of second echelon officials." The specialists divide the more controversial points of the Informatics Law into four great questions, according to the interpretation given to it by the SEI. It is these items that the American Government wishes Brazil would clarify, as was stated in the meeting at Paris 2 weeks ago between the representatives of both sides.

1. The first question would be about that which the critics call the "radical concept of a national company." In the constitution a national company is described as that which has at least 51 percent of its capital in Brazilian hands. However, the Informatics Law establishes in its Article 12 that it may only be a national company if the foreign partner has no more than 30 percent of the capital. In addition to that, the national party in the partnership will have control of technology, which moreover may only be provided by the foreign partner. With such restrictions, up to now there has not appeared a single partnership in the country between foreign and national capital in the field of informatics. "The protectionism stipulated in the Informatics Law is bizarre because it bars the entry of the product and the producer and above all, it makes access to technology difficult," explodes Roberto Campos (PDS-MT), one of the most acerbic critics of the market reserve in computers. The first to test

the real determination of the government is IBM, which entered into partnership with the Gerdau iron and steel group for the creation of a software service supply company--software being the programs that give life to computers, instructing them to carry out the operations desired.

Minister of Science and Technology Renato Archer, to whom the SEI is subordinated, is willing to approve that partnership. As far as he is concerned, the rule of the transfer of technology only applies to the projects of manufacturing equipment and software but not to the sale of services "In that case," says Archer, "the need for the prohibition is not clear, particularly because IBM does not have a registered technology for providing services." In the understanding of one of his advisers, Archer is preferring to give way in this case, satisfying the Americans--who see in the IBM-Gerdau project the great test of the intentions of the Sarney Government--in order to maintain the essential aspects. Even so, there are those in the government who conspire against the idea. "Who will guarantee that the equipment will not simply be passed on from IBM to the new company to the prejudice of national companies?" asks a high SNI official.

2. The second question not clearly defined in the Informatics Law, although there are established written dates, is the period of existence of the ban on foreign participation--a question behind which is hidden what is being called an "invitation to inefficiency." Many specialist argue that the market reserve for national companies has already been going on for 9 years, since the government has banned the imports of informatics equipment since 1977. Counting the 7 remaining years of the existence of the reserve, of the 8 years stipulated in the Informatics Law, that makes 16 years of protection by the state. The fear of many businessmen is that in 1992, when the period set for the SEI to control imports expires, there will arise pressures for its prolongation. "It is not a deal whereby a national businessman can attain efficiency," says a Brazilian banker.

What would be in play would be the fact that if a national company made its product competitive, it would lose the protection of the state. There would be what many consider "an invitation to inefficiency." Businessman Arnon Schreiber, director of Digirede, the third largest national company in the area of banking automation, is one of the most determined defenders of the SEI and the informatics policy. "Without the market reserve, a company such as mine would not exist." But like the Americans, he believes that the benefits of the reserve have to have a specific terminating date. "If in that time informatics in the country are not successful, it is because we are incompetents and there would, therefore, be no reason for perpetuating it," says Schreiber.

3. Another point that has been arousing conflicts is the so-called "reserve within the reserve." Article 22 of the Informatics Law specifies that a foreign company is authorized to manufacture equipment in Brazil when there is no national firm technically capable of producing the same equipment. Since there are many areas or products in which national companies do not master the technology, one way of insuring a sort of "reserve within the reserve" is that of presenting a project for the

manufacture of a piece of equipment within 3 years, for example. In that time, only the company that presented the project may import such equipment, at the same time that it prevents its manufacture by foreign companies.

"In addition to basing itself on the premise that the Brazilian businessman is naive and incapable of defending himself, the SEI gives itself the right to make decisions instead of the businessman," asserts manufacturer Eugenio Staub owner of **Gradient, one of the largest sound industries in the country.** Staub, the only Brazilian entrepeneur in the electronic sector who owns factories abroad--Garrard, the traditional manufacturer of sound equipment in Europe--does not like the market reserve as it is done by the SEI, although he owns part of Conin and also produces microcomputers. "We become accustomed to living without those umbrellas and learn thereby to be more efficient," he said. Similarly, like the majority of Brazilian manufacturers of any size or with ties with foreign capital, he also had his disagreeable experience with the SEI bureaucracy. "They refused a request of ours for the production of equipment, arguing that we should seek another company that was already producing what we wanted to produce," relates Staub. "It is absure, because we would be forced to pay the price that company would demand. Today you cannot breathe without permission from the SEI."

4. Within the coverage of the Informatics Law, actually, is the fourth and fattest chapter of the book of doubts with respect to the market reserve. The conflicts arise from the interpretation given by the SEI to Article 3 of the law. In it is found the reply to the question on what informatics is. According to the law, informatics is any activity directed at research, development, imports and manufacture of electronic equipment. This definition, according to lawyers of foreign companies, demolishes the version wherby reservation of the market would exclude foreign firms only from the market of small computers.

Reservation of the market, however, covers almost everything, if not everything, in the area of electronics. To acquire an idea of what it means, the mechanism that makes a toy car move by remote control, or a simple relay in a refrigerator, is one of the components, which in order to be imported--since there is no one who produces it in the country--has to have an authorization from the SEI. Even a person wanting to import any machine to speed up, improve, or simply reduce the costs of his production line will have to have the approval of the SEI--even though such company may never have dreamed of making even a small battery operated radio. Protected by a legislation that covers almost the entire industrial sector, the SEI is accused by its critics of having concluded by becoming a mammoth with the status of a superministry to which all the others wind up bowing.

Minister of Communications Antonio Carlos Magalhaes is one of those who has most argued for change in this situation in open brawls with his colleague Renato Archer. "We are in favor of a market reserve, because we practice it, but it is not right that only one government agency can choose in all the other areas what is and what is not reserved," says Magalhaes who in the telecommunications sector only operates with companies

in which foreign capital owns a minority share. "They have an excess of power and they speak on an infinity of subjects they do not understand. I do not believe that the SEI has sufficient competence to opine on telecommunications or military materiel." He himslf says that he had to ask for the intercession by Sarney to speed up the examination by the SEI of import plans in his area.

"Much Bureaucracy"

Sid Informatica of the group of Sao Paulo businessman Matias Machline, a long-time personal friend of Sarney, also cooled its heels in the waiting room of the SEI, waiting for an import list. "Several times I have had to face much bureaucracy when dealing with the SEI," acknowledges executive Nelson Wortsman, director-superintendent of Sid, the largest national informatics company. Wortsman supports the market reserve and the Informatics Law and believes that the SEI is generally "positive." Those credentials did not prevent the company from having to wait a year to receive approval for its plan for manufacturing scanners, the optical device used for reading bar codes, the magnetic signs that replace the price tags on merchandise packaging.

If this is the situation for even the best national informatics companies, which in addition to their capabilities have relationships of friendship between their owner and the president of the republic, the scenario could not be worse, therefore, for the companies of foreign origins. "The problem is that the concept of the market reserve is very subjective when it comes to the application of the law," says American Henry Eicher, president of the American company Burroughs in Brazil, which makes medium-size computers. According to him, the legislation, as it is posed, can even prevent foreign firms from making products that today are not within the concept of the reservation. "It is enough for a national industry to decide to manufacture a similar product, but with greater power, and it would conclude by having supremacy in the market, says Eicher. "If the multinational company wanted to update its equipment, it would have to beat on the door of the SEI and there it could be informed that the product henceforth is reserved for national capital."

"Economy of Scale"

He recalls that in 1980 the SEI denied the request for an updating of the electromechanical authenticating machines used in the bank teller's windows. The result: Burroughs closed a factory in Sao Paulo that dismissed 1,600 workers. The SEI, according to him, also said "No" to two other Burroughs projects, which represented investments in Brazil of well over $100 million: the construction of factories and, naturally, the creation of new jobs. The president of IBM Rudolf Pfeiffer, poses another question: Who is going to invest without the guarantee that he will not be excluded from the market? "Now a company only undertakes its technological upgrading, which is the objective of the Informatics Law, by means of large investments," says Pfeiffer. And these investments only pay off if there is an economy of scale." That means that the price of a piece of equipment will be lower as production becomes greater, which naturally would require exports to become feasible.

But how are you going to export something that does not have a competitive price or it is a matter of some equipment produced abroad? The question worries national businessmen, but it bypasses the immediate concerns of government technicians. Antonio Carlos Gil, the president of Sid, knows what it is all about. On orders from Machline, the company invested $7.2 million in the construction of a new plant in Curitiba alongside the present plant and he looks unceasingly for partnerships with foreign companies so as not to miss the bus of new technological gains. "We know we cannot do everything by ourselves," says Gil. "Moreover, there is no place in that market for small companies. However, in order to become big I have to go out of Brazil, and to do that I need alliances with foreign companies." The order of the day in Sid and in Itautec is not to lose time in discussions and to prepare for a future without state paternalism. "With the passage of time of the process the large majority of the firms appearing today are going to disappear natually," forecasts the president of Sid.

"Stupidity"

The secretary general of the Ministry of Science and Technology, economist Luciano Coutinho, believes that it is through there that the future of national informatics will pass. "A technological isolation does not exist nor is it desired," he asserts. "That would be stupidity. What we seek, in short, is to push foreign companies into more sophisticated areas, to the technological frontiers, and by that require that they use all their creative capacity, preserving a space so that national industry may advance." Within that policy, according to Coutinho, is the scope of the Informatics Law. "It is deliberately broad," he admits. The same reasoning is used by Minister Renato Archer for condemning the idea of his colleague, Jose Hugo Castelo Branco (See the box on page 102), who wants to extend the reservation of the market to the advanced chemical and biotechnical areas.

To Archer, the use of that instrument was justified in informatics because it is an activity that intervenes in almost all areas of production: "An intermediate activity," he summarized. "However, we cannot reserve the market in any isolated sectors," says the minister of science and technology. "There we would be violating international regulations."

According to one of his advisors, with that position and that having to do with the IBM-Gerdau partnership, Archer hopes to reduce the swelling, in the short term, of the most inflamed portion of the present diplomatic conflicts between Brazil and the United States. It may be he will manage it. However, the consequences of the application of the Informatics Law in Brazil have already taken place in the present and for the future, and they make their effects felt in the life of the citizens through many facets. Such effects are seen in the prices and quality of the industrial products manufactured in the country; they affect the development plans of companies, affect problems of employment, interfere with the careers of an infinity of professionals, and have an effect on the flow of dollars

from abroad into Brazil. All that has something to do with the daily life of everyone, as can be confirmed by any list, no matter how short, of what the market reserve is doing or may bring about.

The most felt consequence for the Brazilian's budget is in the price of national equipment, whether it be a micro or minicomputer. As an average they are from three to five times as expensive as similar imported items. "This is true, however relative prices are already falling," declares Luciano Coutinho.

At other times the Brazilian may be deprived of having a more sophisticated merchandise available because the SEI prohibits a company from importing some component that brings technological progress. Much is the case of automobile companies, for example, which are having problems importing electronic components, the so-called chips that allow the installation of advanced ignition systems in their cars.

The inflexibility of SEI has also encouraged a burgeoning contraband in microcomputers. In the past year alone, according to estimates resulting from an investigation sponsored by the American Government, nearly 40,000 microcomputers entered illegally into Brazil, half from Apple and half of the IBM PC models, with a value of $250 million.

There is a flourishing contraband of components. There are companies that put their own plans into operation for providing themselves with smuggled components, in that fashion not being obliged to halt the operations of their machinery because of a lack of parts because the SEI has not released its list of parts that may be imported. Suitcases stuffed with miniscule electronic components have been seized at Galeao Airport from fraudulent tourists.

Market reservation has also allowed surprises for buyers of many models of national microcomputers. Two of them of different makes were opened up in the United States by a firm interested in examining what there was in them that was made in Brazil. Almost everything was made in the United States and Japan.

More delicate are the effects on relations between Brazil and its principal trading partner, the United States, which buys $8 billion from Brazil every year in products that have nothing to do with computers, and whose sale is crucial for the operation of the national productive machinery, expansion of business and the number of jobs. The Americans are not asking that Brazil revoke the Informatics Law. What they want is a complete clarification of the controversial points and what they question is the interpretation given by the SEI. After all, the American Government, according to its spokesmen, expects some signal from the Sarney Government.

"It is impossible to cultivate a stable trade relationship when only one side obtains unilateral advantages," says a high official of the Department of State stationed in Brazil. There are threats of retaliation against Brazilian exports--and one of the most immediate targets, according to

specialists, may be in the very active national footwear industry, which sells 100 million pairs of shoes abroad per year, 95 percent of which go to the United States. "It is obvious and well known that as things are going now, we shall pay the consequences and with it will come unemployment," warns the largest exporter of shoes of Rio Grande do Sul, Ernane Reuter.

The present situation also has led the country to lose many investments, which translates into fewer jobs, fewer exports and less money circulating in the market. Even the EMBRAER [Brazilian Aeronautics Company] state company, has already been prevented from establishing a partnership in one of its subsidiaries, Engematic, manufacturer of aircraft landing gear, with the American firm Foxboro. From that partnership would come an effort to sell on the Latin American market. The efforts of the then president of EMBRAER and now president of PETROBRAS, Col Ozires Silva, were to no avail, and much less so were those of the minister of aeronautics. The SEI forbade the partnership.

In another case, the American corporation Hewlett-Packard, which makes calculaters and small scientific computers in Campinas, was forbidden by the SEI to make medium-sized equipment for export. Texas Instruments was forbidden to double its production in Campinas, which was also going to be exported--and the company's new plant wound up being installed in Argentina. Motorola, which has been in Brazil for years, received a memorandum from the SEI in which the agency determines that its activities should be gradually shut down.

Closing the circle, a large number of foreign companies decided to halt their investments in the subsidiaries they have in Brazil, waiting to see what happens. Such is the case of the giants such as Olivetti, Siemens, Philips--none of them American, showing that the Brazil-United States clash is already having effects on frontiers that have nothing to do with the two countries. General Motors has not yet had a reply from the SEI to its application for making digital components in Brazil for its new car, the Kadet--an investment of $500 million. The SEI demands that GM give a national company the technology of those components, a present the American company refuses to give.

It is no wonder that the dispute between Brazil and its main trade partners does not cease to grow. There is much more to this dispute, which the more it develops the more it increases perplexity around a policy which appeared for creating national technology, but which up to now the most it has done is to send investments, jobs, products and good diplomatic relations by the board in exchange for a still vague promise of our own path in the area of informatics. It could be that further on, when a balance is made of that policy, some profit for the country may show up. For the time being, however, the result has not yet emerged from the red.

[Box, pp 100-101]

Of all the questions raised by the application of the Informatics Law in Brazil, one of the most delicate is that which has to do with a miniscule

part called a chip, the soul of the computer. Brazil has not yet managed to produce a chip and for many, the market reserve is at the root of that lag. According to estimates of the Informatics Technological Center, the CTI, the first Brazilian chip should appear in 1990. That year, American chips will have been in existence for 30 years. The Brazilian chip will be able to store 16,000 pieces of information. Two years ago, the computers sold in the United States had chips in their circuits with a capacity of memorizing more than 200,000 bits of information. At the beginning of this year, the American matrix of the IBM, the largest computer industry in the world, announced that its coming models will be capable of retaining 1 million pieces of information. In company laboratories in the United States, chips with a phenomenal memory consiting of 2 million pieces of information are being tested. In 1990, when the first Brazilian chip comes out of the ovens of the CTI, similar models will certainly already be on exhibition in the United States and Japan as parts of a remote bygone technology. "There is a very great lag in technology in microelectronics in Brazil by comparison with that of other countries," says researcher Hiran Josvel Marques, chief of the IBM scientific center in Brazil. Marques resorts to a picture to illustrate the importance of a chip in making a computer. "Not having the chip is the equivalent of making the plans for a house without having bricks or cement," he says. Faced with that adverse picture, Brazilian manufacturers are going ahead of research institutes and skipping phases, which means planning a chip here which is later manufactured on order from American companies. That demonstrates once more the Achilles heel of the market reserve: pressured by competition, national manufacturers cannot wait for the maturation of a native technology and are forced to resort to the traditional centers of technological generation. The same route is also travelled by manufacturers of the entire world. Only in the United States are the three essential conditions for the development of microelectronic technology present: capital, accumulated knowledge in research, and a market for assimilating products on a large scale. None of those prerequisites exists in Brazil today--at least not in the proportions necessary. National manufacturers disagree with the theory that Brazil is technologically lagging. "It is necessary to remember that we did not begin to produce in the same period as they did," says Mario Ripper, president of Elebra Computadores. "We are traveling along paths that will allow us to do more important things with fewer investments."

[Box, p 102]

Advanced Chemistry, a Sector in the Sights of the Government

The government is ready to create another zone of friction with its trading partners. A new problem may arise with France, the United States, Switzerland and Germany in case the idea now underway in the Ministry of Industry and Commerce is carried out of excluding foreign capital companies from the Brazilian market of raw materials for the pharmaceutical sector--the so-called advanced cheminstry. The text of the draft bill, revealed last week by the newspaper FOLHA DE S. PAULO, increased the suspicions of foreign companies even more that the Brazilian Government does not view them favorably. Such a law, if it were to be approved by President Jose

Sarney, would only give a legal standing to a position already adopted by the government. Rhodia, a subsidiary of the French giant Rhone-Poulenc, for example, has a plant near the Sao Paulo municipality of Paulinia, in which $15 million were invested for the production of salicylate--the raw material of acetyl salicylate, the basic component of analgesics. Now Rhodia cannot put the plant into operation because the Ministry of Industry and Commerce will not give it a permit. The argument is that there is a Brazilian company--Carbonor of Bahia--which is going to produce that product. "Such arbitrariness is not right," says Edson Vaz Musa, president of Rhodia.

In a conversation with the chief of the Ministry, Jose Hugo Castelo Branco, Musa heard the strange proposal that Rhodia could sell salicylate only as long as Carbocloro [as published] did not go into operation. After that, it could only export it. The positions of Castelo Branco with respect to foreign capital truly make up a tangle of contradictions. He is against the excesses of the SEI in informatics, advocates the manufacture of aluminum sheets by the American Reynolds Company, and now wants to expel the foreign companies of the chemical and pharmaceutical products, a proposal so radical that not even Minister of Science and Technology Renato Archer agrees with him.

8908/9190
CSO: 5500/2071

DIGITAL PHONE INSTALLATIONS FROM ERICSSON, SIEMENS, NIPPON

Stockholm SVENSKA DAGBLADET in Swedish 1 Aug 86 p III

[Text] Together with Siemens and Nippon Electronics Corporation (NEC), Ericsson has received an order worth around 1.3 billion kronor from the state-owned Venezuelan telephone company. The order involves 1 million telephone circuits for digital communication, e.g. a system that turns speech into computer language using 1's and 0's.

In the first stage Ericsson will deliver equipment worth around 65 million kronor from Sweden, with delivery starting this year. It is estimated that the first stage will have a total value of around 195 million kronor for the three companies involved.

It is not yet clear when deliveries will start in stage two. Talks will be initiated with regard to when stage two should begin, according to Gunilla Posenius of Ericsson's information division.

The equipment in stage two will be produced in Venezuela.

The delivery also includes training the people who will be looking after the systems.

Today there are 755,000 telephone circuits delivered by Ericsson in the country and 45,000 of them are hooked up to Ericsson's electronic AXE exchanges.

6578
CSO: 5500/2717

SABC ANNOUNCES FM FREQUENCY CHANGES

MB011714 Johannesburg Domestic Service in English 1600 GMT 1 Aug 86

[Text] The SABC has announced that its FM sound broadcasting frequencies are to change because of a decision by the International Telecommunications Union which controls radio activities throughout the world.

African countries and some European countries have been instructed by the union to change their FM broadcasting frequencies to comply with international standards.

In South Africa these frequencies will be implemented regionally over a period of time and the first changes have already been made. The most remarkable aspect of the changes is the change of spacing between the FM channel frequencies which will be located around 100 khz instead of 86 khz as in the past. In addition to the changes planned or the existing FM sound broadcasting frequencies, the SABC has decided to make use of the opportunity to group the frequencies of all radio programs into blocks. This means that all frequencies of Radio South Africa will be in one so-called block, that is, between 100.7 and 1003.7. The Afrikaans service, Radio Suid Afrika, will be located between 104.3 and 107.3 khz.

All the so-called community services such as Radio Highveld, Radio Good Hope, Radio Prt Natal, Radio Algoa, Radio Jacaranda, and Radio Oranje will be located in another separate block.

Information charts with the new frequency blocks are to be distributed by the SABC in conjunction with the Total Old Company throughout the country. The charts will be available at all Total Service stations and SABC offices throughout South Africa from Monday 4 August. The charts will indicate clearly where listeners will have tune into their favorite stations.

Under the new frequency system, transmitters broadcasting the same program in one town will be located very closely on the tuning dial to transmitters broadcasting to neighboring towns. Synthesized receivers, particularly those used in motor vehicles, will tune in precisley to a frequency which will enable listeners to remain tuned to one station without having to tune from one frequency to another on the FM band while, for example, traveling from one town to another. Some changes have already been introduced in parts of the Transvaal and the Orange Free State.

Further announcements will be made periodically to keep listeners informed.

/9599
CSO: 5500/100

BRIEFS

SATELLITE STATION EXPANSION PLANS--The Director of Posts and Telecoms Mr John Sikhondze has disclosed that plans are underway to expand the Ezulwini satellite station to facilitate direct telephone contact with countries like Zambia. Mr Sikhondze said this would cut the country's dependence on South Africa for transit facilities. He said Canada, which loaned the country 3.5 million dollars towards the construction of the present station, was going to finance its expansion under the Southern African Development Coordination conference's intercontactivity project aimed at improving the standard of communication among the SADCC countries. He added that although the satellite covers European countries, there are African countries it cannot cover such as Zambia and others without transit in the Republic of South Africa. [Excerpt] [Mbabane THE TIMES OF SWAZILAND in English 8 Aug 86 p 3] /9599

CSO: 5500/100

INITIAL STRUCTURE, BUSINESS LINES OF CGE-ITT JOINT VENTURE

Implications of Merger

Paris LE MONDE in French 1 Aug 86 p 21

[Article by Eric Le Boucher: "CGE Becomes Number Two in the World in Telecommunications"--boxed material as indicated]

[Excerpts] By absorbing the telecommunications activities of the American ITT group, the CGE [General Electric Power Company] has become Number Two in the world in that sector. The nationalized French enterprise has gained entree to the difficult European markets. It is a costly transaction, however, and also a very risky one.

"The agreements that I have concluded with the ITT on the one hand and Philips on the other...guarantee to Europe that it will have an industrial presence at the turn of the century, and a position of leadership in the key sector of telecommunications.... My basic hope is that my teams will now be able to exploit at the international level the historic opportunity that is opening up for France." It was with these words that Georges Pebereau left the CGE presidency. He accordingly bequeathed a fine legacy to the man chosen by the government as his replacement, Pierre Suard, a company man (he had served as vice president of Alcatel, the telecommunications subsidiary of CGE).

How does it happen that a "historic opportunity" for the CGE, France, and Europe has been so well received by the American side? Has the CGE therefore made such a good deal? Has it--as Pebereau claims--guaranteed its industrial future until the year 2000?

The contradictory comment from both sides of the Atlantic proves that the answer is at least not obvious. One thing is certain: ITT realizes an immediate profit by receiving a sum in cash of $1.25 billion (plus $350 million as reimbursement for 2 years of debt). It divests itself of an activity that caused it to incur debt totaling approximately $2.8 billion--equal to more than half of its annual sales in this sector. The expenses incurred in connection with the very difficult development of its "System 12" telephone exchange have drained its resources. It has lost markets in certain countries (Norway) and has had to give up others (the United States).

The CGE, for its part, is making a triple wager: financial, technological, and commercial. ITT-Telecommunications was valued at $1.7 billion (12 billion francs), a sum that the CGE was quite incapable of obtaining from its own resources. A complex financial arrangement was accordingly put in place. This plan called for ITT and Alcatel to contribute their assets to a joint company and to overvalue them ($2.8 billion for ITT, $1.4 billion for Alcatel). The shares of stock in the new company were accordingly assigned a book value twice their real worth. This procedure--a classic one, by the way--makes it possible to obtain payment of twice the admission price of the interested European partners and thereby recover some of the money. The disadvantage is that these potential partners are also...thinking twice about the arrangement. This is what has already happened since 2 July. As of that date, the plan was for ITT to reduce its share in the joint company. A European holding company with the code name of EUROTEL was to take a 70 percent share. The CGE wanted to keep approximately 60 percent of EUROTEL, which meant that it had to find something like four minority partners at 10 percent each.

To date, however, only two have been found: Telefonica ($300 million), the company that runs the Spanish telephone system, and the General Company of Belgium ($250 million). Other candidates--such as STET [Telephone Finance Corporation], the company that runs the Italian telephone system--declined; the British GEC and Plessey did likewise. The arrangement had therefore to be modified. ITT agreed--at the insistence of Balladur himself--to retain a "temporary" 37 percent share in the joint company (with EUROTEL obtaining a 63 percent share); but CGE will still have to find another $700 million.

That will not be impossible. The company will sell some of its other activities in France, and in particular will cede back many ITT subsidiaries that were acquired in related sectors such as defense, components, and electronics for the general public. (Footnote 1) (The "Yalta agreement" signed with Thomson in 1983 (division of spheres of activity until 31 December 1989) also binds the CGE to divest itself of its activities in the spheres of defense; components; and electronics for the general public.) It will also incur new debt.

It was doubtless difficult for the CGE to do otherwise, but the acquisition--via this arrangement--is expensive. "Between 40 and 50 percent too expensive," was the estimate of former socialist posts and telegraph minister Mexandeau. This became a source of concern to the present government (hence the intervention of the minister of state). It feared that the other CGE activities--in particular, the nuclear activities--might be affected thereby, and indeed that the group--whose unity is already fragile--might ultimately have to break up into two parts: telecommunications on the one hand, energy (Alsthom and Framatome) on the other. Even though it was in the end possible to obtain guarantees--such as the appointment of Ambroise Roux as chief executive officer of the CGE--the financial risk remains. In any case, this is likely to complicate and delay the planned privatization of the CGE.

Competition Among the Telephone Exchanges

The second wager is technological in nature. Alcatel already has two telephone exchanges: its own exchange (E 10 B) and the one (MT) it inherited from

Thomson-Telecommunications, a company it absorbed in late 1983. The respective leaderships attempted to have them "converge" by developing joint lines of business--an effort that is costly in terms of engineers. The acquisition of System 12 will complicate their task, in that three products will have to be "converged" while their competitors will have their entire staffs available to modernize their own products.

The fact is that the technological competition among the telephone exchanges was greatly intensified with the deregulation of telecommunications; the advent of new services; (Footnote 2) (The objective of the operating companies (the P and T [Posts and Telegraph] in Europe) is to place at the disposal of the general public the services that are already offered by the private exchanges: automatic calling, call forwarding, automatic redial....) and the transmission of data. It is a fundamental turning point for this industry that ATT--the number one American company--is forcing on its competitors. The Thomson-CGE merger--with the attendant dispersal of effort--had already caused the CGE to fall behind. The CGE will now have to do three things at once: put the finishing touches on System 12--an objective whose attainment is not even assured; make System 12 compatible with the MT and E 10 B; and modernize the entire gamut. It is a gamble, some experts say.

If the European partners take flight, the CGE risks disappointing a number of people and losing their "deposits" at their local P and T offices. If it in addition becomes entangled in the wires of its too numerous telephone exchanges, the markets acquired at such expense will be in danger of rapidly slipping away. The danger is that the CGE will find itself with 150,000 people on its hands, and customers who will gradually turn their backs on it in favor of ATT, Ericcson, Northern Telecom, or Siemens.

The quality of management during the period immediately following the merger will therefore be crucial. This undoubtedly explains why Pebereau was removed as president: he had acquired a bad reputation as a manager following the Thomson-CGE merger. His successor has inherited his strategy, however, which is to buy markets (external growth) rather than win them gradually with better products. Doubtless no other course was possible, in view of past management performance and the delay caused. Doubtless it is necessary to proceed in this fashion in Europe, where each country has inherited protectionist barriers against the other Europeans. A French presence in the year 2000, however, is by no means a sure thing, but it is not impossible. Everything remains to be done.

[Box, p 21]

Who Will Run the CGE?

Ambroise Roux has been appointed by the government to be chief executive officer of the CGE (JOURNAL OFFICIEL of 30 July). It is a second appearance: Roux was PDG [president-director general] of the CGE until the advent of the Left. Refusing to accept nationalization of his group, he resigned. A confidant of President Pompidou; a veritable "pasha" of the world of the employers (he was

vice president of the CNPF [National Council of French Employers]); and a man of very great influence, he has many friends among the intimates of Chirac.

When it became necessary to replace the PDG's, his advice was certainly decisive. Did he turn thumbs down on Georges Pebereau, who had been its general manager before 1981, thereby dooming him? There are many who say: "It is Ambroise and Balladur who cut off Georges' head and put Pierre Suard in his place." The new PDG of the CGE will in any event find that his board of directors is a protective (and very enveloping) wing.

[Box, p 21]

$9.8 Billion in Sales

The new company born of the merger of Alcatel with ITT-Telecommunications represents total sales of $9.6 billion for 1986, broken down to 78 percent in Europe, 13 percent in the United States, and 9 percent in the rest of the world. By individual sector, the breakdown is as follows:

[1] Public telecommunications (such as telephone exchanges and radio links), 50 percent.

[2] Business telecommunications (such as private telephone exchanges, office equipment, videotex, telephone radiograms, 33 percent.

[3] Industrial and military equipment, 10 percent.

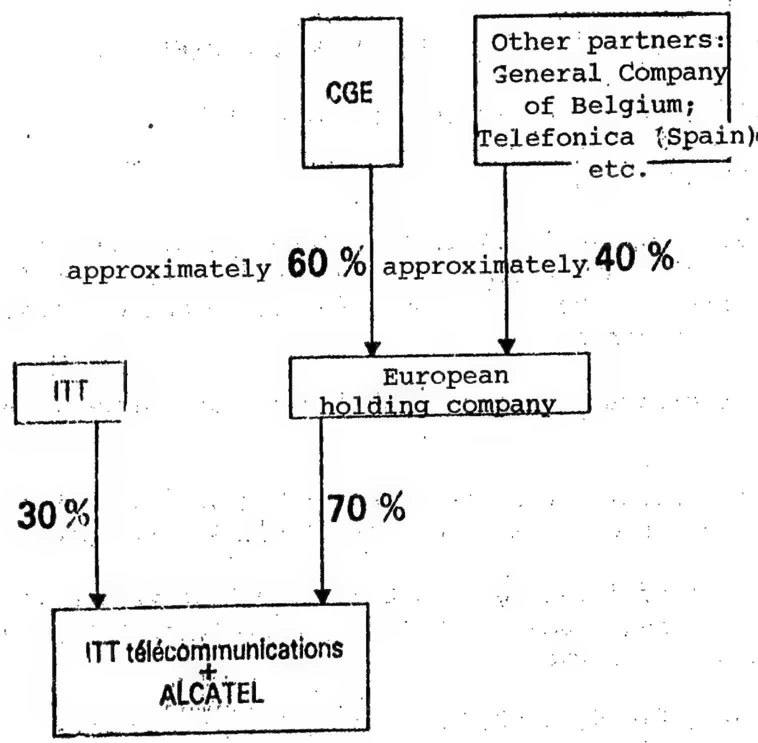
[4] Electronics for the general public (television sets), 7 percent.

The CGE brings to the new company all of Alcatel and its subsidiaries. ITT brings its German subsidiary (Standard Electrik Lorenz, 85.9 percent of whose capital stock is held by ITT and which has 30,000 employees); its Belgian subsidiary (10,000 employees); its Italian subsidiary (14,000 employees); and its Austrian subsidiary (3,000 employees); and so forth. The 24 percent interest held by ITT in the British group STC (notably a shareholder in the company that manufactures the ICL computers) would be included in the agreement, according to the CGE.

New Organization

Paris LE MONDE in French 4 July 86 p 25

[Excerpt] Organizational Chart of the New Group



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ERICSSON HOPES FOR TEN-PERCENT SHARE OF U.S. MARKET

Stockholm DAGENS NYHETER in Swedish 19 Jul 86 p 8

[Article by Dan Magnerot]

[Text] Swedish Ericsson's AXE telephone system has met the stone-hard requirements in the United States, and the firm has therefore taken a giant stride toward entering the U.S. market for telephone exchanges--a market worth 30 billion kronor annually.

A contract for the first exchange has already been signed, and one or two more are imminent.

Bellcore--the technical laboratory for the regional Bell telephone companies--has now completed its evaluation of Ericsson's AXE telephone system.

"The report is not official yet, but we know that we did very well. We have passed a 'milestone,'" says Bo Nilsson, who is in charge of marketing and sales for Ericsson in Texas.

And in yesterday's FINANCIAL TIMES, Bruce DeMayer, head of central purchasing for the Ameritech telephone company, said: "Ericsson is going to come out of Bellcore's test with a very favorable assessment of its AXE exchange."

A spokesman for another telephone company--Southwestern Bell in St. Louis--said in the same newspaper: "We are very impressed by Ericsson's product."

If a telephone system is to have a chance on the U.S. market, it must get past Bellcore's evaluation. If it does not, there will be no orders.

Baptism of Fire

Bellcore will tell the companies whether the product is going to stand up as well as the manufacturer says it will. In addition, and even more important, Bellcore will say whether the telephone system meets the requirements of the U.S. market. Those requirements are listed in a requirement specification that fills seven volumes.

"The evaluation is extremely rigorous and comprehensive. Technical design is examined in great detail, as are the system's performance and serviceability. The requirements are very stiff," says Bo Nilsson.

Since Ericsson has now come through that "baptism of fire," the firm can begin competing seriously on the U.S. telephone market, which turns over 30 billion kronor per year and is the world's largest.

Also within the past few days, there has been definite agreement on a contract to supply the first AXE installation to the Mountain Bell telephone company, a subsidiary of U.S. West.

Bo Nilsson says: "Mountain Bell has been receiving continuous information on Bellcore's evaluation. The fact that it has now signed a contract is proof that we did well."

Clearing the Way

Bo Nilsson also points out that having a contract in one's hand is considerably different than having a letter of intent. A letter of intent was signed by the two companies just over a month ago in connection with the deal that has now been finalized.

Thanks to that contract, Ericsson will be able to install its first AXE equipment in the United States. This also clears the way for the firm to become one of the chief suppliers of telephone exchanges to the seven American telephone companies.

"The events of the past few weeks have meant a very big step forward for us. We are now completely certain for the first time that we are serious participants. The rest of this year and next year will be very exciting," says Bo Nilsson.

And Bo Nilsson is backed up by a spokesman for one of Ericsson's competitors, who said in yesterday's FINANCIAL TIMES: "Ericsson is on the way to making a real breakthrough in the United States, and sales in the United States may become a real 'winning ticket' for the firm."

More Contracts?

According to Bo Nilsson, Ericsson expects one or two more contracts for telephone exchanges to be signed in the very near future.

"A lot of things are working in our favor now. As Bellcore has progressed with its evaluation, interest in our AXE exchanges has increased markedly," says Bo Nilsson.

Ericsson's goal is to win 10 percent of the U.S. market. That corresponds roughly to sales of between 1 billion and 3 billion kronor per year. Or, to put it another way, between 350,000 and 700,000 telephone lines per year.

Crucial

A market share of 5 percent through 1990 would cover the cost of the billions of kronor invested in the United States. Next year will be the really crucial time for Ericsson. That is when the regional telephone companies will begin ordering on a large scale.

If the firm can get in on that as well, its investment in the U.S. market will have been a very big success--one that is badly needed by a firm whose profit curve has been pointing downward for the past few years.

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ERICSSON INCREASINGLY ALONE AS COMPETITORS TIGHTEN LINKS

Shuns Merger, Foreign Tie

Stockholm SVENSKA DAGBLADET in Swedish 25 Jul 86 Sec III p 1

[Article by Jerry Simonsson]

[Text] Competition on the international telecommunications market is getting even stiffer and the first signs of branch structuring have been detected. The merger of CGE of France and America's ITT is one of them. But while international alliances are being forged, Ericsson has chosen to wait a while and would rather stand alone.

However Ericsson has discussed cooperation with other companies on a great many occasions. So far these discussions have only led to cooperation in the area of basic technology. One reason why nothing has happened is that Ericsson has not found any partner that could give the company any new technical expertise.

High development costs are another reason why companies decide to join forces. That was the case with ITT, which is now selling its telecommunications section to France's CGE (Compagnie Generale d'Electricite). And while development costs are shooting up, equipment prices are declining. Market development has not lived up to expectations either. The United States and Europe account for most of the growth in public telecommunications networks and that is where the contest will be decided.

French Market

For Ericsson, Europe (outside of Sweden) represents about 20 percent of the market for public telecommunications and now this primarily concerns the French market. After the CGE monopoly was broken up a foreign supplier has been sought and the French do not have to look hard for volunteers. In addition to Ericsson, Siemens, Canada's Northern Telecom, Japan's NEC and ATT&T are ready to absorb the 16 percent of the French market that is now open for bids. Not a very big market, but big enough to interest the colossal ATT&T which accounts for approximately 30 percent of the world market, evidence of the stiff competition. The remaining 84 percent of the French market is controlled by CGE's manufacturing company, Alcatel.

The French were expected to announce their decision at the end of July, but the privatization discussions have delayed things. It is believed that political considerations will be an important factor and that will be a handicap for Ericsson in particular. The French-American union between CGE and ITT is also regarded as having made things even more difficult for Ericsson.

Siemens of Germany is regarded as having the best chance. This is partly because the company has promised to buy part of the other French telecommunications company, CGCT, which has been struggling with economic problems for a long time, and partly because Siemens can indirectly open up the German market for France's Alcatel.

England is Ericsson's best single European market. Deliveries of the company's AXE digital telephone exchange will begin next year.

United States the Goal

The United States, which accounts for around 35 percent of the growth in the public telecommunications sector, is everyone's ideal goal. It is dominated today by ATT&T and Northern Telecom, but the Americans would like at least one more supplier. Again Ericsson and Siemens are the two finalists. Siemens has decided to cooperate with America's GTE in order to facilitate its application while Ericsson has again chosen to stand alone. Today Siemens received four orders for its digital telephone exchange; this week Ericsson received its third trial order. For Ericsson the U.S. adventure has been nothing but an expense so far. It is estimated that not until around 1989-1990 can field tests of the AXE system start generating income in the form of concrete orders.

U.S. Tests Expensive

Stockholm SVENSKA DAGBLADET in Swedish 26 Jul 86 Sec III p 1

[Article by Lennart Lundquist]

[Text] "If we get more trial orders in the United States it will put more pressure on the concern. I cannot give any time framework for how long the extraordinary costs will weigh Ericsson down."

These remarks were made by Carl Wilhelm Ros, vice president of Ericsson. The three so-called trial orders Ericsson has received from the United States mean that the company's AXE exchange is being tested for a period of time by the customer without being purchased. A trial order costs Ericsson a lot of money. This week the concern took the unusual step of saying openly in a telex communication that the enormous economic investments in the United States and Great Britain will affect profits in the short term. The market reacted immediately. The price of Ericsson's stock fell sharply on the stock exchange.

Pilot Systems

America's ITT, Ericsson's toughest competitor, invested around 1 billion kronor before abandoning the attempt to adapt its exchange to the market. Ericsson has invested 140 million kronor a year in its AXE exchange, but so far this has led to nothing but expensive trial orders, not real orders that produce money.

"The next step after the trial orders will be pilot systems in 1987. We expect to get orders in 1988 and that means money will start coming in around 1989-1990," said Carl Wilhelm Ros.

How important is it for Ericsson to succeed in the United States?

"It is not entirely crucial, but it is extremely important. The development costs we are paying for also have some value as far as our efforts in Great Britain are concerned. Ericsson has shown in 64 countries that we have a good system and that the AXE exchange works."

Hasn't the development work in the United States taken longer than the firm anticipated?

"No. In the last 2 or 3 years things have gone as we expected. We were prepared for one or two trial orders and we received three."

How long will the "extraordinary costs" continue to be a burden to Ericsson?

"I cannot give any time framework. If we get more trial orders it will be more of a strain. But we think we have enough now."

Several telecommunications companies have decided to join forces, especially because of high development costs. CGE of France joined America's ITT, while Ericsson has chosen to stand alone.

Will the semiannual financial report be good or bad?

"That depends on the expectations one has."

Losses From U.S. Venture

Stockholm SVENSKA DAGBLADET in Swedish 27 Jul 86 p III

[Commentary by Uno Skold: "National Bank Disappoints Stock Exchange"]

[Excerpts] The general downward trend on the stock exchange Thursday reflected some disappointment that the National Bank did not announce any lowering of the discount rate after its meeting in the morning. Ericsson's announcement that the year's results will be diminished by high costs also seems to have contributed to a general reduction of stock prices.

Heavy Burden

The announcement by Ericsson president Bjorn Svedberg that the investments the concern made in the United States and Great Britain will be a heavy burden on profits in the short term was regarded on the stock exchange as a warning signal that the semiannual report will be unexpectedly poor. The price of Ericsson stocks dropped sharply on Thursday and the discouraging news seemed to affect other leading stocks on the exchange as well.

There have been rumors for some time in both Sweden and the United States that the Ericsson report that is due to come out on 28 August will be considerably poorer than expected. This had already led to sharp reductions in the price of Ericsson stocks.

Bjorn Svedberg's special emphasis of the fact that investment costs will be a heavy burden in the short term completely overshadowed the effect of the reports of Ericsson's latest successes in the United States.

Stock Market Uncertain

As things are now, the stock market feels even less certain about Ericsson's prospects. No one knows for sure how many problems the company still has and it is hard to estimate when there will be a real surge in company profits.

But it is quite obvious that people have expectations in connection with Ericsson. One can see that in the market rate for Ericsson options, which is based on their theoretical value. Thus one can say that there are clear expectations that Ericsson stock prices will be considerably higher a little later on.

Brokers at the exchange building reported Thursday that the Ericsson stocks that became available were being offered for sale and that there was a clear interest in them in many quarters. Therefore it looks as if the bottom may have been reached for Ericsson stocks.

Company Wants Own Finance Company

Stockholm SVENSKA DAGBLADET in Swedish 30 Jul 86 p 21

[Article by Bjorn Suneson]

[Text] The Ericsson concern is applying to the Bank Inspection Board for permission to form a finance company. The concern's foreign finance companies will be incorporated in the company.

SVENSKA DAGBLADET has learned that according to plans the finance company will borrow money directly on the Swedish money market. However the foreign companies will borrow money locally.

Since the beginning of the 1980's, the Ericsson concern's financing activities have been handled by the L M Ericsson Finance Company. However the company

has not had finance company status and this has also limited its freedom of action.

Reorganization

Therefore Ericsson will now reorganize the company as a finance company. If the Bank Inspection Board gives its approval, the company plans to go out and borrow directly on the Swedish money market. In the past current activity has been financed with loans from the parent company, Telefon AB L M Ericsson.

Ericsson Finance president Gosta Stahlberg confirmed that the company is applying for finance company status. But he declined to make any further comment on the matter.

"All I can say today is that we want more freedom of action," he said. "We plan to release some information on the matter later on."

New Partners

On 1 July of this year Industrivarden, Finans Vendor, Investor and Providentia became new partners in Ericsson Finance. Following that Ericsson owns 75 percent of the company.

Providentia president Per Lundberg has been suggested as the chairman of the company's board of directors.

Computer Ventures

So far Ericsson Finance has been mainly involved in leasing and financing various computer ventures within the Ericsson concern in Sweden. Ericsson employees were also able to borrow money for car purchases. Several hundred employees have made use of this opportunity. Now there may also be other functions outside the Ericsson concern.

Today Ericsson Finance is a partner in several foreign finance companies. The plan is that some of these companies will become wholly owned by Ericsson as early as this year. In addition, two of Ericsson's foreign finance companies will be moved directly in under Ericsson Finance.

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